WATER WORKS & SEWERAGE

SPARTANBURG'S "AERO-FILTER"

From the SOLOMONS to REYKJAVIK...

CHLORINE performs a vital service!

From Iceland's rocky shores to the steaming South Sea jungles, chlorine and chlorine compounds are protecting the health of our fighting men.

One of the most serious threats to the physical welfare of troops—particularly in an invading or occupying force—is water-borne disease. Chlorine is most effective in fighting this ever-present hazard. That is why it is an *essential* part of the equipment of every unit of our armed forces—protecting vital water supply and promoting sanitation. It represents a service we are proud to perform.

Our wartime experience in producing chlorine for this and many other urgent and vital needs will help us to serve you better after this war is won.

CHEMISTRY IS THE KEYSTONE OF INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

1000 WIDENER BUILDING • PHILADELPHIA

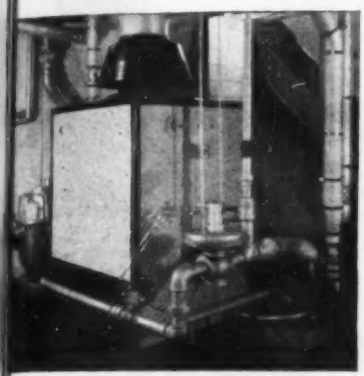
NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • MINNEAPOLIS • WYANDOTTE • TACOMA

WATER WORKS & SEWERAGE, July, 1943. Volume 90. Number 7. Published monthly by Gillette Publishing Co., 330 South Wells Street, Chicago, Ill. Per copy, 25c. Subscription rate, United States, $2.00 per year; Canada, $2.00 per year; Foreign, $3.00 per year. Entered as Second Class Matter, June 2, 1931, at the Post Office at Chicago, Ill., under act of March 3, 1879.

In the SEWAGE PLANT *at* TONAWANDA NEW YORK

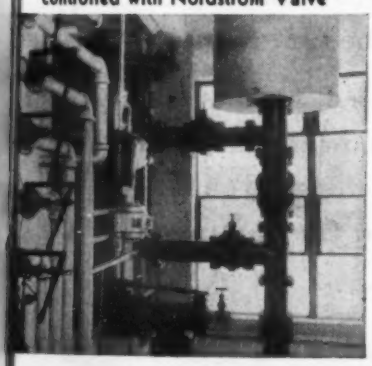
Accurate Measurement and Control

EMCO SEWAGE GAS METERS
PITTSBURGH HOT WATER METERS
NORDSTROM LUBRICATED PLUG VALVES



Above—Main heating boiler equipped with EMCO Gas Appliance Regulators. EMCO Sewage Gas Meter in background

Below—Sludge inlet and supernatant liquor lines of primary digester are controlled with Nordstrom Valve



Tonawanda, a bustling industrial city in western New York, with a municipal population of 13,008, operates a fine, modern sewage treatment plant. It was first placed in service in 1940 after being constructed from plans developed by the consulting engineering firm of Metcalf and Eddy. This property can handle the disposal needs of a population of 22,000 with an average sewage flow of 3.5 M.G.D.

The Tonawanda plant is replete with interesting applications of Nordstrom Lubricated Plug Valves, EMCO Sewage Gas Meters and Pittsburgh Hot Water Meters.

Nordstrom Valves with their quick, quarter-turn operation, leak resistance and freedom from sticking, are a "natural" for use on all sludge lines. Valuable operating data is provided by measuring the sewage gas generated, consumed and wasted with EMCO Sewage Gas Meters. The amount of hot water circulated to the digestion tanks is recorded by a Pittsburgh Hot Water Meter.

PITTSBURGH EQUITABLE METER COMPANY

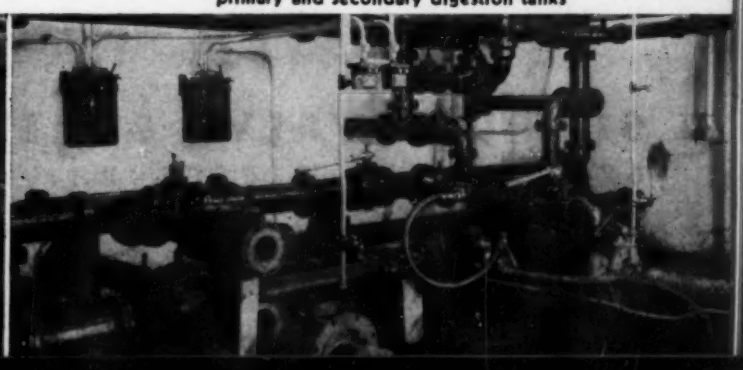
NEW YORK · BROOKLYN · DES MOINES · MEMPHIS · OAKLAND · TULSA · CHICAGO · BOSTON

MERCO NORDSTROM VALVE COMPANY
Main Offices, Pittsburgh, Pa.
NATIONAL METER DIVISION, Brooklyn, N. Y.

KANSAS CITY · PITTSBURGH · SAN FRANCISCO · LOS ANGELES · SEATTLE · HOUSTON · COLUMBIA · BUFFALO

EMCO Meter measuring sewage gas used by boilers

Nordstrom Valves on sludge lines in lower operating gallery between primary and secondary digestion tanks



Portrait of "A MIND AT EASE"

Simplex "S" Controllers have established a reputation for long, dependable service that is taken for granted by thousands of design and operating men in plants all over the country.

We receive many comments from new as well as old users telling us of the steady, behind-the-scenes job our Controllers, Fluid Counterweights, and Clear Well Shut-Offs are doing to maintain peak efficiency for overburdened operating staffs in plants whose capacities are often being taxed to the very limit.

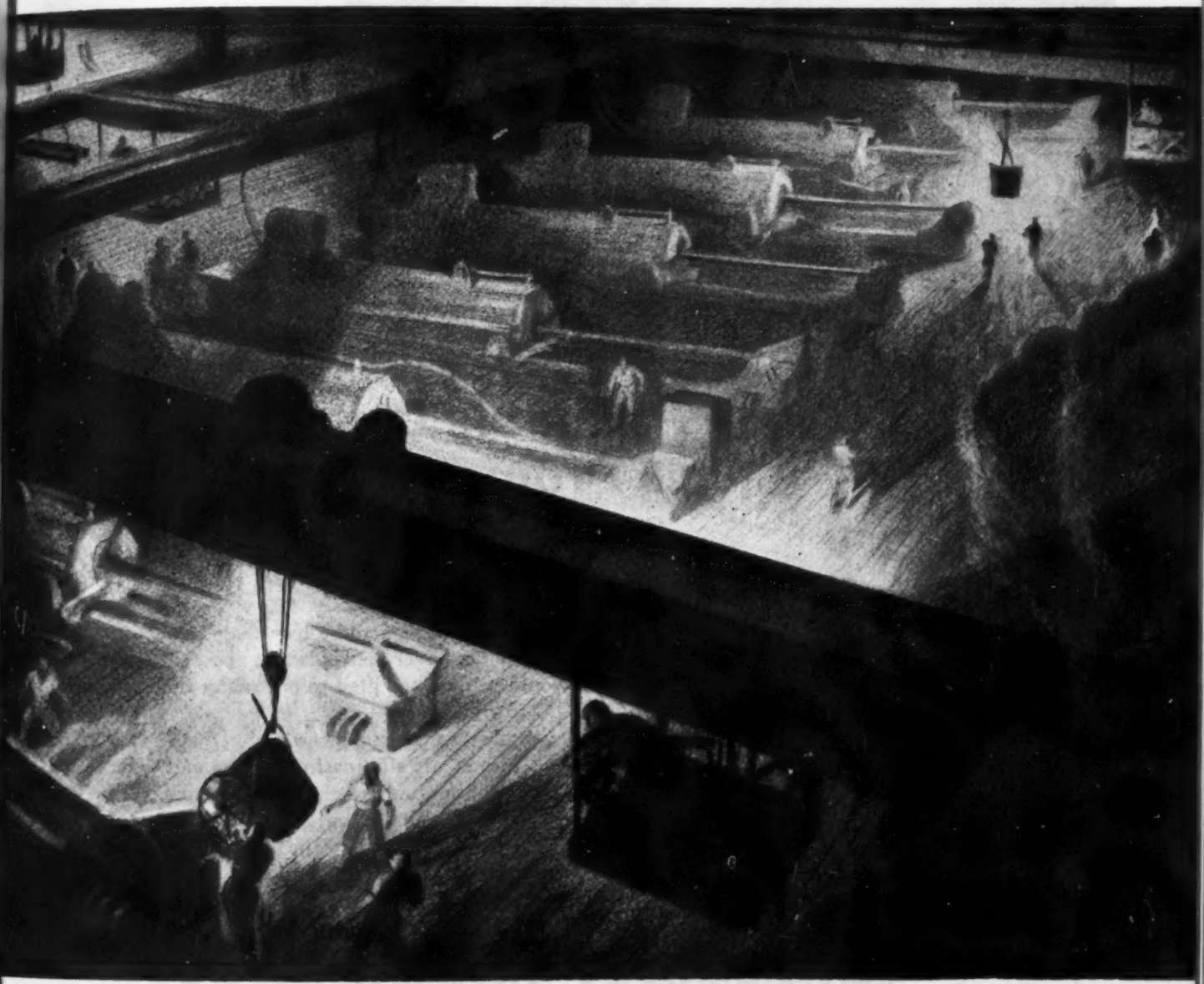
Certainly we are pleased, but not altogether surprised, since we know we have a fine line of control equipment, designed and proved as the right answer to your flow control problem.

The recently published Simplex Bulletin 250 gives clear-cut specification data that is worth filing for ready reference. Your copy will be sent immediately without obligation.

SIMPLEX VALVE & METER COMPANY
6743 UPLAND STREET, PHILADELPHIA, PENNA.

Pipe foundry *NEW* style

The picture below is of a cast iron pipe foundry. Pipe is made in electrically and hydraulically operated centrifugal casting machines which are carefully regulated to produce the diameter and thickness of pipe desired for a particular pressure class. The pipe is then heat-treated, dipped, tested, trademarked, inspected and ready to load on cars or trucks. It's a streamlined operation of large, yet flexible, capacity, with quality controls at every step from raw materials to finished pipe. Immediate shipments with proper priorities.



rane's-eye view of a battery of casting machines in one of our plants, drawn by Hugh Ferriss.

UNITED STATES PIPE & FOUNDRY CO.

General Offices: Burlington, New Jersey. *Plants and Sales Offices throughout the U. S. A.*

for the PEOPLE

Palatable Drinking Water Promotes Good Will

Over 1,200 water plants throughout this country have employed Aqua Nuchar Activated Carbon to produce palatable drinking water.

A recent survey covering nearly 850 water plants showed the cost of Activated Carbon to be less than 2c per capita per year. The average tax payer demands and appreciates palatable water, and would be only too glad to pay many times this small average per capita cost.

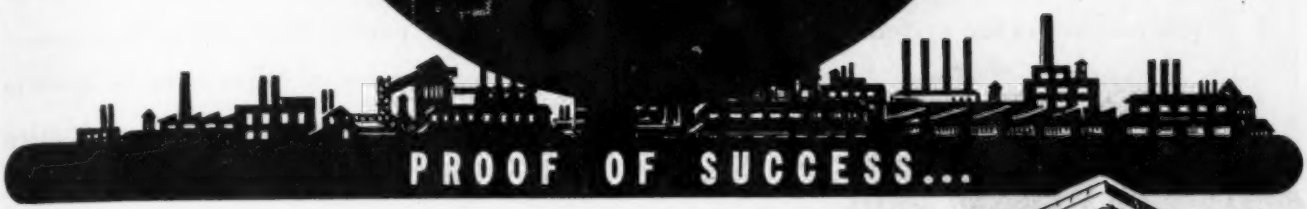
Aqua Nuchar has been demonstrated conclusively to be the most effective means of eliminating tastes and odors from water supplies. Check your stocks now and make sure that you have an adequate supply on hand so that you will be promoting "good will" during the summer months with palatable drinking water.

NUCHAR

INDUSTRIAL CHEMICAL SALES

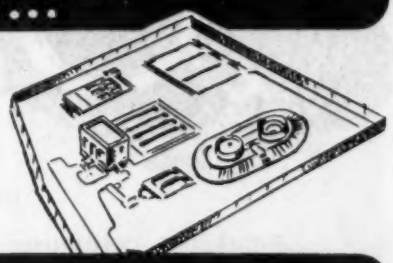
End

SEWAGE CLOGGING by INSTALLING FLUSH-KLEENS or COMMINUTORS



PROOF OF SUCCESS...

Flush-Kleens or Comminutors Eliminate Health-Menacing Sewage Clogging as Women Replace Men in War Production Plants.



3,000 FLUSH-KLEENS IN OPERATION

Comminutors Installed at Inlets to Sewage Plants Protect Mechanical Equipment and Eliminate Manual Labor, Health Hazards and Nuisances in Handling Screenings.

1,000 COMMINUTORS INSTALLED

Unsightly and Insanitary Beach and Shore Contamination Resulting from War-Time Sewage Disposal Direct to a Water Course Is Eliminated by Installing Comminutors in the Outfall Sewer.

CHICAGO PUMP COMPANY

SEWAGE EQUIPMENT DIVISION

2300 WOLFRAM STREET — **CHICAGO 18, ILLINOIS**

Electric Pumps: Circulating, Bilge, Scru-Peller, Flush-Kleen, Plunger, Fire, House, Condensation, Vacuum.

Swing Diffusers, Stationary Diffusers. Mechanical Aerators, Combination Aerator-Clarifiers, Comminutors.

Plans made NOW mean

when our soldiers come home from war

Everybody knows that war has made it necessary to postpone repairs, replacements and extensions to the water supply, gas and sewerage systems of this country. This growing backlog of deferred construction already represents millions of man-hours of employment for returning soldiers and laid-off war workers.

* * *

It is the patriotic obligation of the managers of these public utilities to see that detailed plans are prepared now so that the work can start without delay when the war is over. Every consulting engineer and engineering department should be working overtime if necessary until the last plan is ready. Nobody questions that these indispensable public services should start needed construction at the earliest possible moment.

* * *

Water supply, gas and sewage works construction gives quick employment to many thousands of men, locally and elsewhere. It will help Industry get clicking at a time when many plants will have to convert to peacetime production. Seven industries—large employers of labor—are involved in the production, transportation and laying of cast iron pipe alone.

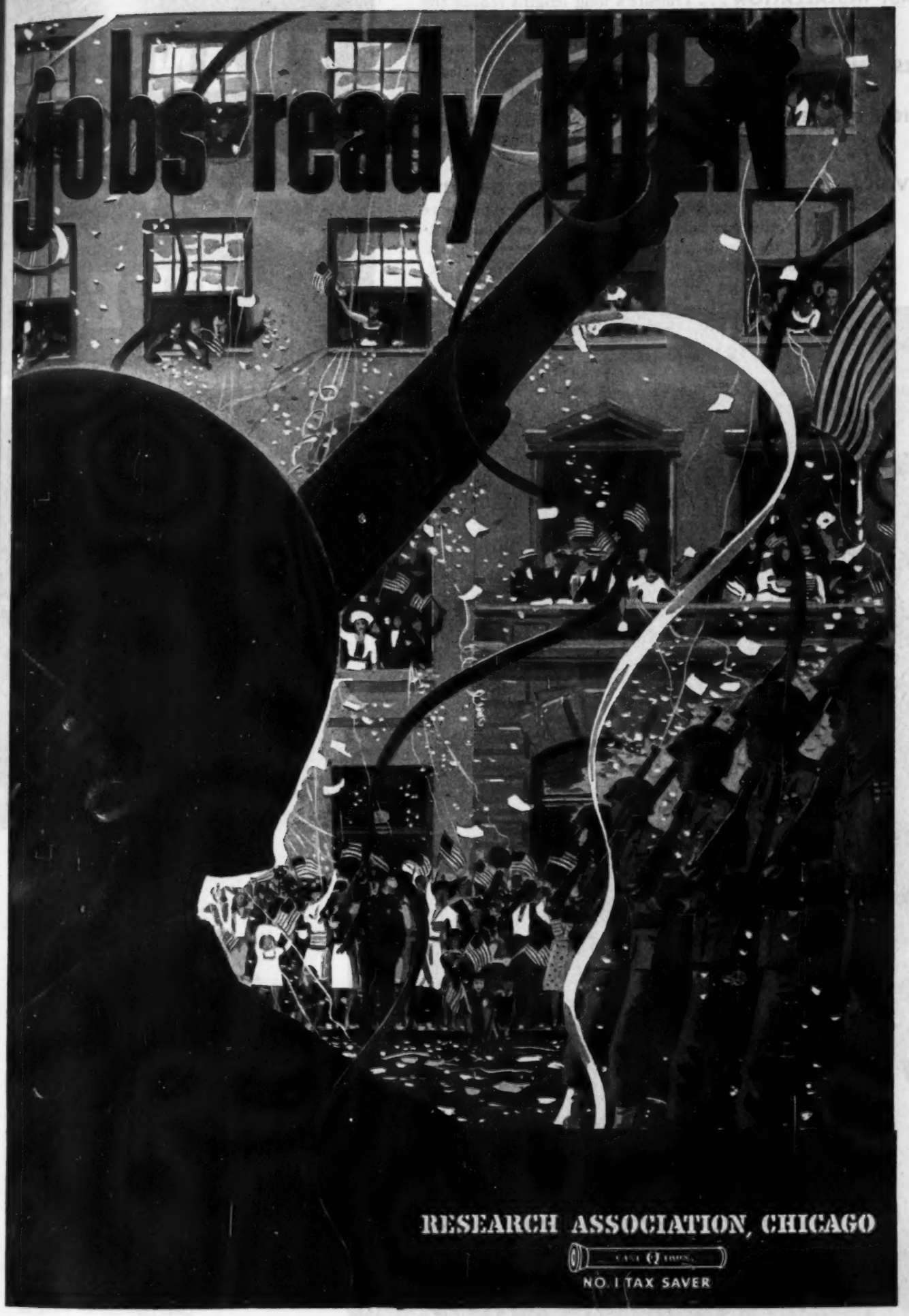
* * *

Preparing working plans and specifications now will not interfere with the winning of the war. But it will go a long way towards the right sort of welcome for our returning soldiers. Victory arches and a band at the station, yes—but also, *jobs*.

* * *

Any of the members of this Association will furnish promptly information and advice in the preparation of specifications taking full advantage of the greater economy and efficiency of cast iron pipe made in accordance with the new A.S.A. Law of Design*—pipe scientifically designed for your specific service requirements.

** Send for booklet entitled "Manual For The Computation Of Strength And Thickness Of Cast Iron Pipe—Approved by American Standards Association" explaining the principles and methods which are the basis of the new A.S.A. Law of Design.*


jobs ready
RESEARCH ASSOCIATION, CHICAGO
NO. 1 TAX SAVER

QUICK FACTS ON TRANSITE SEWER PIPE

FAST INSTALLATION . . . Transite's long lengths reduce the number of joints needed in the line . . . its light weight permits easier, faster, more economical handling.

LESS INFILTRATION . . . Fewer, tighter joints minimize leakage, cutting down on the load at the disposal plant.

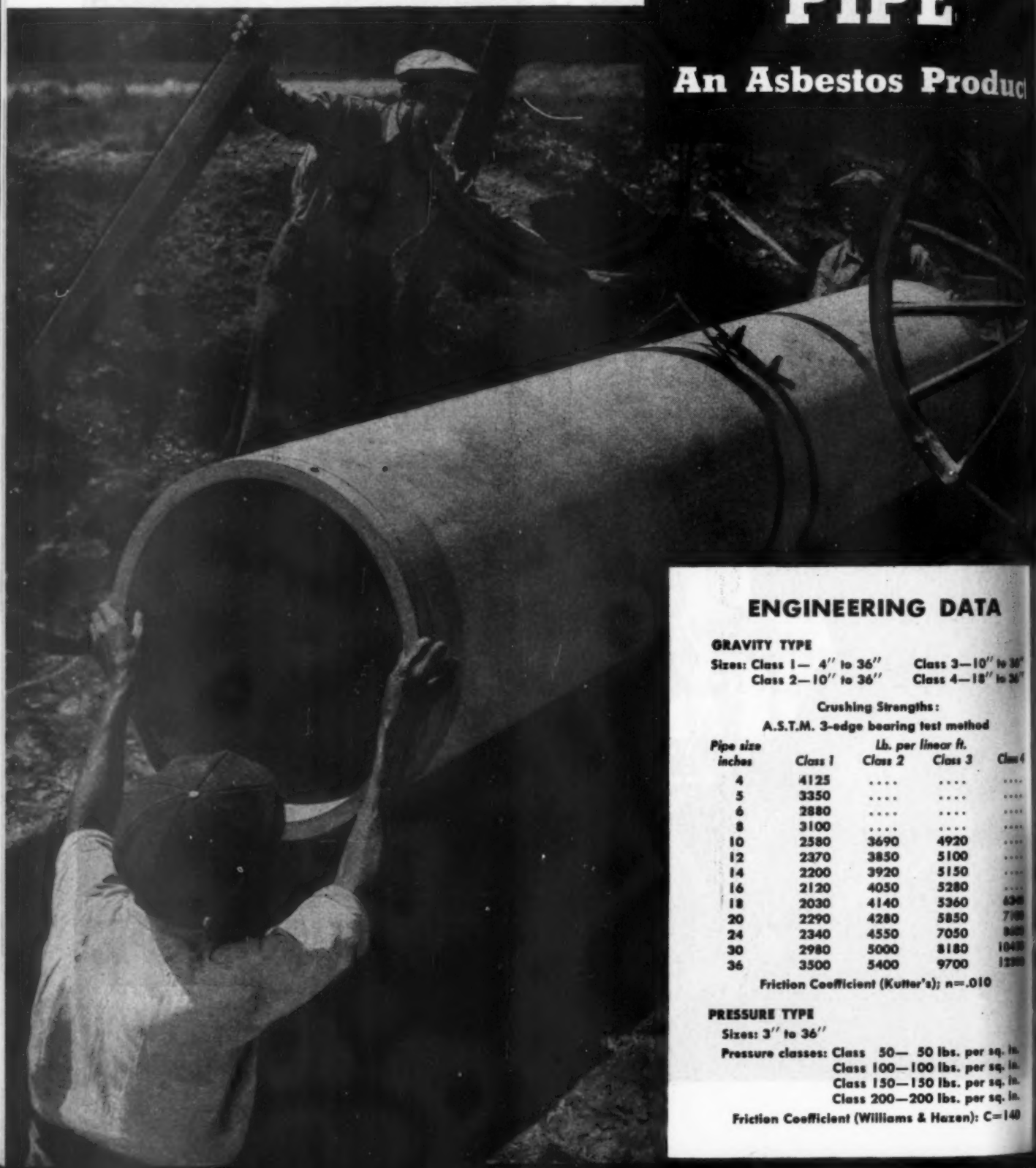
HIGH DELIVERY CAPACITY . . . This advantage of Transite Pipe frequently permits smaller pipe or flatter grades, resulting in shallower trenches.

AVAILABLE BOTH FOR FORCE MAINS AND GRAVITY LINES . . . Complete information is given in brochure TR-21A. And for details on lower-cost water transportation, send for Transite Water Pipe Brochure TR-11A. Johns-Manville, 22 East 40th Street, New York, N. Y.

Johns-Manville

TRANSITE SEWER PIPE

An Asbestos Product



ENGINEERING DATA

GRAVITY TYPE

Sizes: Class 1— 4" to 36" Class 3—10" to 36"
Class 2—10" to 36" Class 4—18" to 36"

Crushing Strengths:
A.S.T.M. 3-edge bearing test method

Pipe size inches	Lb. per linear ft. Class 1	Class 2	Class 3	Class 4
4	4125	....	....	....
5	3350	....	....	....
6	2880	....	....	....
8	3100	....	....	....
10	2580	3690	4920	....
12	2370	3850	5100	....
14	2200	3920	5150	....
16	2120	4050	5280	....
18	2030	4140	5360	6340
20	2290	4280	5850	7190
24	2340	4550	7050	8600
30	2980	5000	8180	10430
36	3500	5400	9700	12300

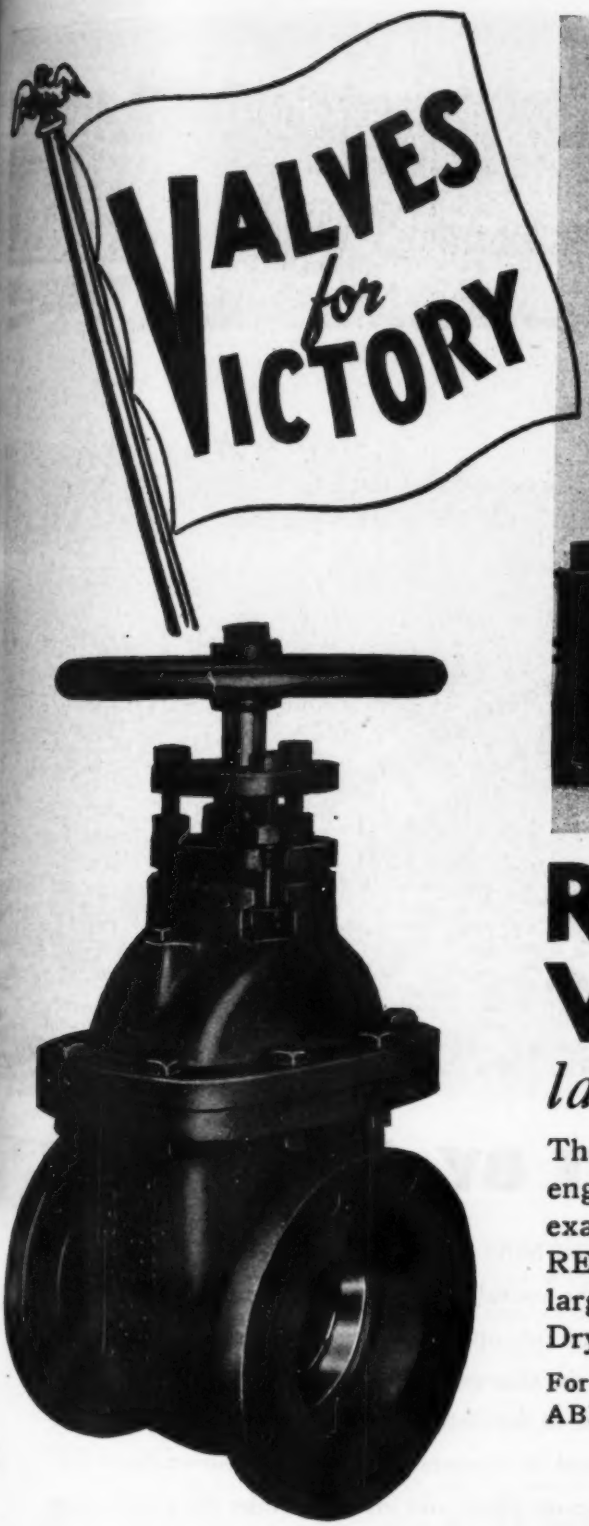
Friction Coefficient (Kutter's): n=.010

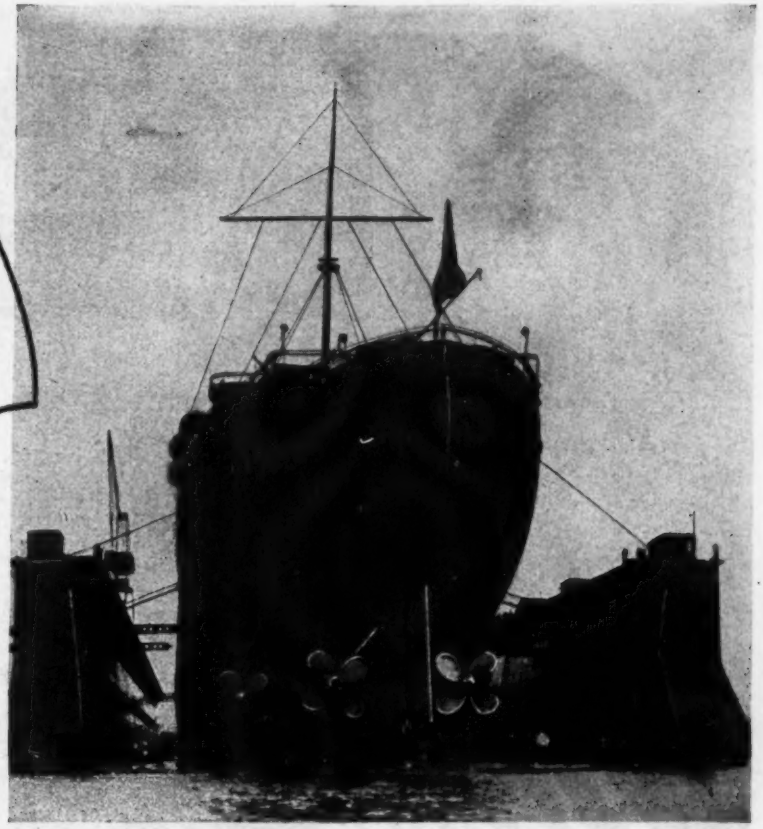
PRESSURE TYPE

Sizes: 3" to 36"

Pressure classes: Class 50— 50 lbs. per sq. in.
Class 100—100 lbs. per sq. in.
Class 150—150 lbs. per sq. in.
Class 200—200 lbs. per sq. in.

Friction Coefficient (Williams & Hazen): C=140





RENSSELAER VALVES *Vital in Our largest Modern Drydocks*

The present conflict has aptly been called a "war of engineers." Here, we believe, is one of the best examples of "engineered" valve installations. RENSSELAER has supplied many hundreds of large valves and operating assemblies for Floating Dry Docks.

For installations requiring the UTMOST IN DEPENDABILITY, engineers specify RENSSELAER.

★

Write for Bulletin X

RENSSELAER VALVE CO., TROY, N. Y.

BRANCH OFFICES

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PITTSBURGH, PA., Oliver Building
SAN FRANCISCO, CAL., Sharon Building
SEATTLE, WASH., 2726 First Avenue, South

DIRECT REPRESENTATIVES

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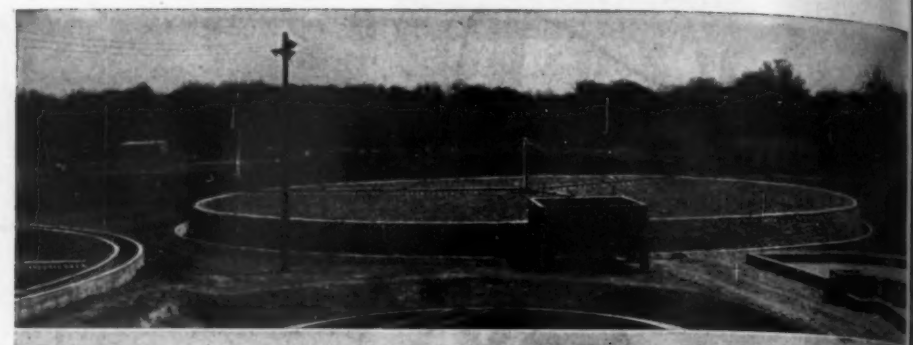
PHILADELPHIA, PA. 14 Rockhill Rd., Bala-Cynwyd (Mr. R. W. Turner)
ROCHESTER, N. Y., 131 Hurstbourne Road (Mr. J. S. Ten Eyck)
OKLAHOMA CITY, OKLA., Braniff Building (Mr. E. J. Connelly)



Again

SEWAGE EQUIPMENT BY GRAVER

Graver's ability to design and build sewage equipment to meet the most exacting requirements of the consulting engineer is again demonstrated in this installation recently put into operation at a Government Cantonment. Above is an illustration of the Graver Rotary Distributor, 145 feet in diameter, and a close-up of one of the distributor arms and the spray nozzles. This equipment was designed in cooperation with U.S. Government Engineers, fabricated in the Graver plant, and installed under the supervision of Graver engineers — another example of Graver's complete service and undivided responsibility.

Our engineers will gladly discuss your sewage treatment problems with you and submit quotations without obligation.

GRAVER

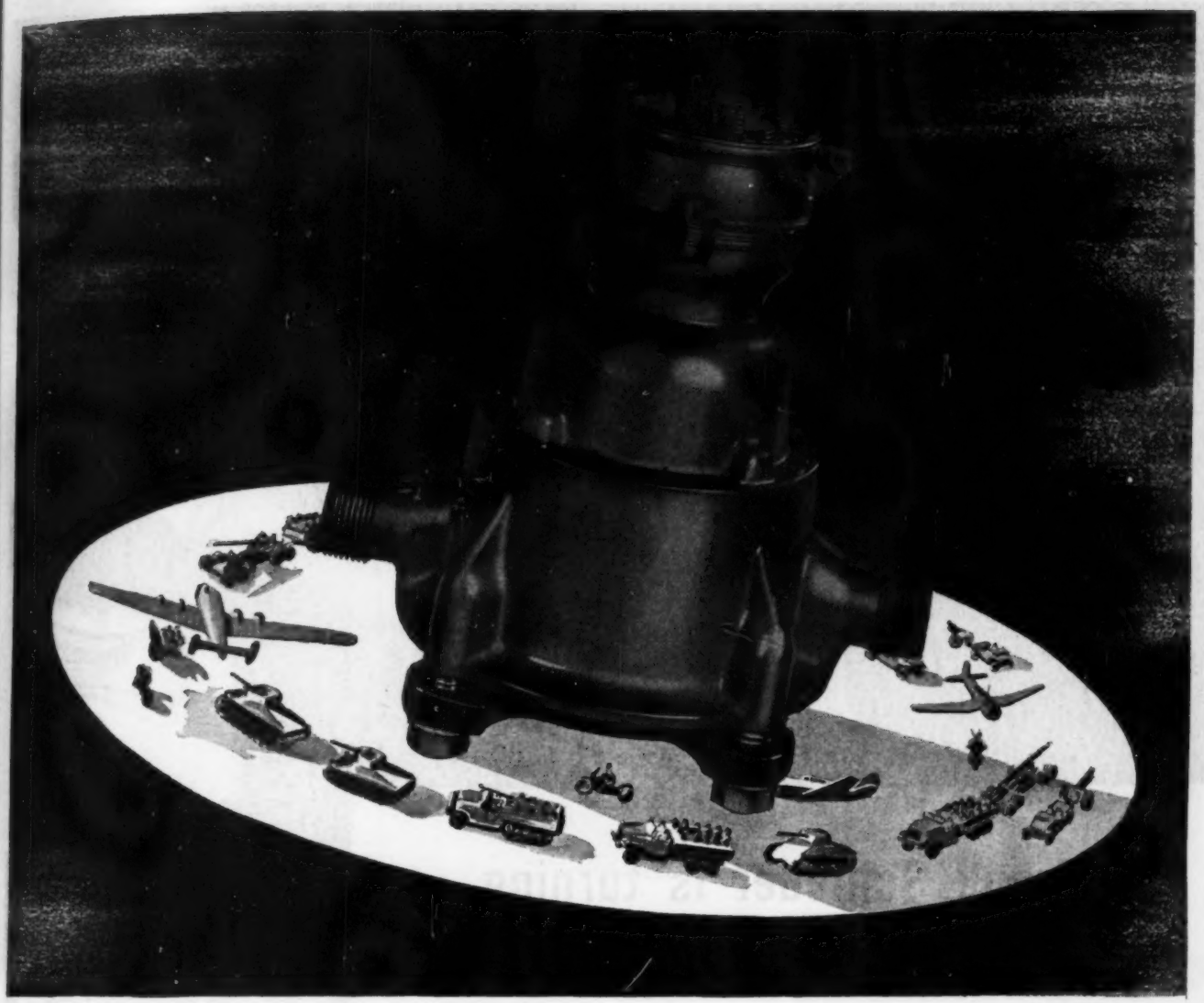
GRAVER TANK & MFG. CO., INC.

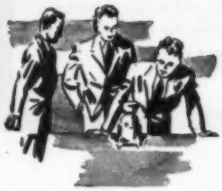
NEW YORK
CATASAUQUA, PA.

4809-43 TOD AVE.
EAST CHICAGO, IND.
CABLE ADDRESS — GRATANK

CHICAGO
TULSA

43-33-W





NOTHING NEW NEED BE ADDED WITH BADGERS ON DUTY

The sound judgment of water works men who selected Badger Water Meters is paying dividends now. With skilled maintenance men at a premium, and materials still critical, Badger dependability and long life are saving man-hours and metals in many communities.

Badger performance is no surprise to men who have long had first-hand knowledge of Water Meter records. Since 1905 they have seen Badgers perform with a minimum of repair and replacement. Precision recording combined with ruggedness, protect revenues and provide long years of low-cost maintenance — as little as 1c per meter per year.

The Badger organization is prepared to help you with conservation of water meters—now a patriotic duty. Whether your problem is one of maintenance, repair or replacement, feel free to call on us.

BADGER METER MANUFACTURING CO.
MILWAUKEE • WISCONSIN

BRANCH OFFICES: New York City • Tampa, Fla. • Seattle, Wash. Savannah, Ga. • Kansas City, Mo. • Marshalltown, Iowa • Waco, Texas Los Angeles, Calif. • Chicago, Ill. • Philadelphia, Pa.

Frank Schieder is turning out plenty of brass for his son in the Navy

Here he is showing Radioman Bob —recently home on furlough—how one of the special heat control mechanisms, used by American Brass, operates to produce metal of the correct temper.

Frank Schieder doesn't need an "E" pennant to remind him of the importance of all-out production for war needs (although he's proud of the one his plant is flying). He has an even better reminder in his son, Bob... Radioman, U. S. Navy.

It's like that, too, with thousands of other American Brass workers who have sons and brothers and other kith and kin in the armed forces. They aren't producing just the finest copper and brass, but war materials for *them* . . . to help speed the day of victory. Over 3,500 former fellow workers, themselves, are now serving with Uncle Sam.

You'll find the same urge to produce for victory in all thirteen plants which The American Brass Company operates in the U. S. A. and Canada. They are turning out the greatest volume of copper and brass in the company's history—and expect to produce still more . . . all of it for war use. They consider their Army-Navy "E" pennants only a challenge.

United America is pulling together

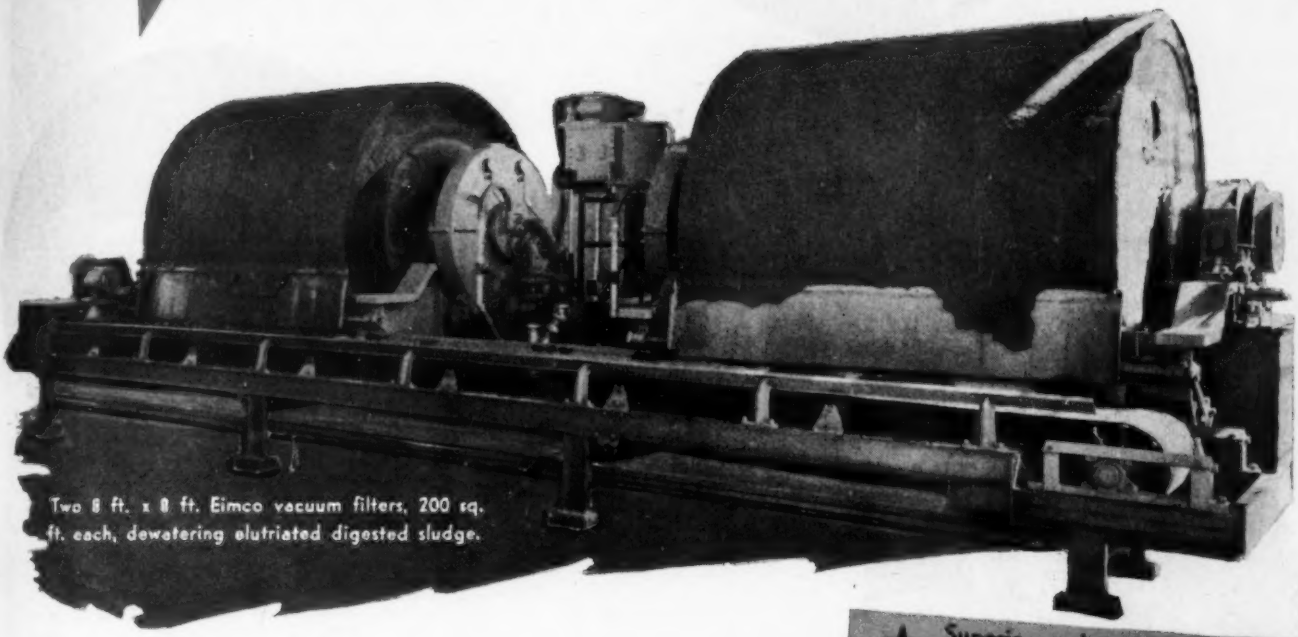
As citizens and as a nation, American people are united in fighting this war—on the battle front and on the home front . . . buying War Bonds . . . conserving rationed materials . . . making the best of shortages . . . doing their part wherever they can.

And we can all have the satisfaction of knowing that the restrictions and sacrifices of today make possible tomorrow's victory. For example, Everdur* Metal, Anaconda's strong, corrosion-resistant copper-silicon alloy, is being produced in large quantities—not for water works or sewage construction—but for tough war jobs. adv

THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd., *New Toronto, Ont.*

ANACONDA *Anaconda Copper & Brass*

5 *Reasons for the Preference of* — EIMCO SEWAGE FILTERS



Two 8 ft. x 8 ft. Eimco vacuum filters, 200 sq. ft. each, dewatering elutriated digested sludge.

Eimco Sewage Engineering includes research, design, construction and installations of Filter Stations.

Long established supremacy in the Sewage field is due primarily to Eimco's careful investigation of local conditions so that all equipment is custom built to predetermined specfications.

Accessories such as conveyors, sludge-conditioning equipment, vacuum systems, elevators and mix tanks are carefully designed and built to take up a minimum of floor space and to complete a compact effcient and attractive filter station.

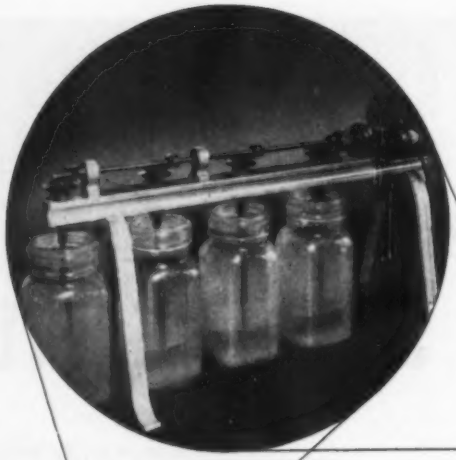
Eimco Engineers welcome an opportunity to aid in planning post-war sewage treatments plants. Why not call on them for assistance now!

- ★ Superior workmanship and Heavy Duty Construction.
- ★ Complete Design and Engineering Service.
- ★ Eimco Assumes Responsibility of Complete Filter installations.
- ★ Preliminary Estimates and Layouts available without obligation.
- ★ Backed by Nation Wide Experience.

THE EIMCO CORPORATION

SALT LAKE CITY, UTAH, U.S.A.

NEW YORK 120 Broadway | CHICAGO 111 W. Washington St. | EL PASO Mills Bldg. | SACRAMENTO 1217 7th St.



1. TEST WATER OR SEWAGE OFTEN. In most plants conditions change daily . . . or even hourly. That is why it pays to make frequent, careful laboratory jar tests. Only in this way can you be sure of maintaining the right pH for most efficient use of Ferrisul.

How To
SAVE FERRISUL
Without Sacrificing Plant Efficiency

2. CHECK FEEDING EQUIPMENT to be sure Ferrisul is being dissolved completely. When shutting down dry-feed equipment: (1) Stop the dry feeder and water feeder at the same time; (2) continue agitation for at least 30 minutes to be sure *all* Ferrisul is dissolved.

3. STORE PROPERLY. Although Ferrisul is easy to handle and store and will not freeze in winter nor melt and cake in summer, ordinary care should be taken to avoid damaging packages and to keep the chemical from direct contact with water. Ferrisul is the only anhydrous ferric sulfate available commercially.

Ferrisul is doing important services for victory. It is extensively used in pickling metals vital to the war, and is serving other war-essential industries in ways we are not at liberty to disclose. These war industries prefer Ferrisul for the same reasons that make it the favorite in your field: (1) It is economical because of its high iron content; (2) it is uniform; (3) it is easy to handle and store.

Because of the heavy demand on the limited supply of Ferrisul, it is necessary for every pound of this busy chemical to be used to the greatest efficiency in every field that it serves. Therefore we are asking water and sewage treatment supervisors, who have solved many difficult treating problems and increased plant efficiency with Ferrisul, to use this effective and highly flexible coagulant with the greatest possible economy.

We shall be pleased to send a member of our capable technical staff to make specific suggestions on possible economies in your plant. This service is free and puts you under no obligation. For the assistance of these experts, please contact: MONSANTO CHEMICAL COMPANY, Merrimac Division, Everett Station, Boston 49, Massachusetts.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

Help! Prompt return of empty tank cars, carboys and returnable drums will help speed your next shipment of Monsanto chemicals . . . by helping to relieve critical shortages in shipping equipment.

Dependable Chlorination
A must for every municipality
in Peace Time or War
Because of the unfailing purity and uniformity of DIAMOND LIQUID CHLORINE, you can always depend *absolutely* on this vital product.
Shipments are made in cylinders or cars according to your requirements, from our centrally located plant at Painesville, Ohio.
In peace time or war, DIAMOND LIQUID CHLORINE helps you safeguard water treatment.
DIAMOND ALKALI COMPANY
PITTSBURGH, PA. and Everywhere
ALKALI
CHLOR

Symbol of efficient water transportation

FROM the Great Lakes to the Gulf . . . from Maine to California . . . in thousands of small and large communities the J-M trade mark stands for efficient, economical water transportation. For it means Transite Pipe, the modern, asbestos-cement water pipe that offers the advantages of light weight, high corrosion resistance and freedom from tuberculation and electrolysis.

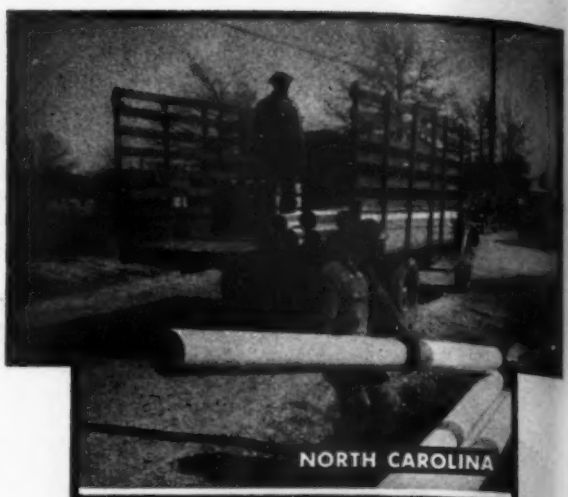
J-M Transite Pipe is being used today in hundreds of both temporary and permanent military camps and bases throughout the world. And while military requirements have higher priority, Transite Pipe is also available for essential civilian needs.

For the complete details on this basic advance in water-line engineering write for Transite Pipe Booklet TR-11A. For information on Transite Sewer Pipe for lower cost sewage disposal, ask for TR-21A. Write Johns-Manville, 22 East 40th Street, New York, 16, N. Y.

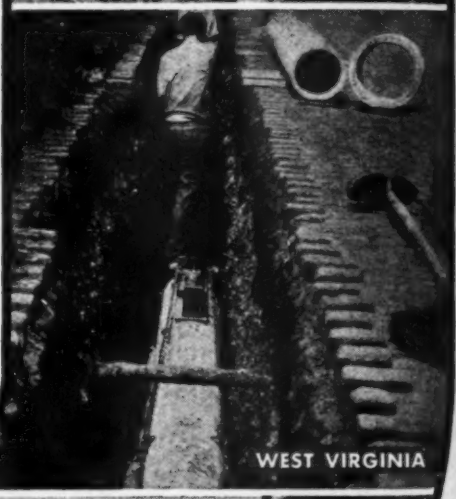
JOHNS-MANVILLE *Asbestos*

Transite Pipe

FOR EFFICIENT, ECONOMICAL WATER AND SEWER LINES


NORTH CAROLINA

OHIO


WEST VIRGINIA

TEXAS

NEW JERSEY

GEORGIA

JOHNS-MANVILLE
JM
PRODUCTS

VIRGINIA
CALIFORNIA
MASSACHUSETTS
MICHIGAN
MISSOURI
PENNSYLVANIA
MAINE
WASHINGTON
NEW YORK

for outstanding performance

. . . on the Production Front

The Army-Navy "E" flag, signifying exceptional performance in the production of war materials, now flies over three of the Chicago Bridge & Iron Company's shipyards. Over 12,000 of our employees are privileged to wear the "E" pin in proud tribute to their war production effort.

IT'S been said that this is the age of production miracles. But is it? To those who *really* know American industry, today's staggering production figures cause no surprise.

The foundations for these so-called production miracles were laid years and generations *before* Pearl Harbor. The needs of war have brought to light the vast amount of "know how" that industry has accumulated through years of research and experimentation. This knowledge of how to accomplish things *fast* and *well*, is enabling our nation to mete out the potent weapons of war at a rate that augurs disaster for our enemies.

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sound as the day it was installed

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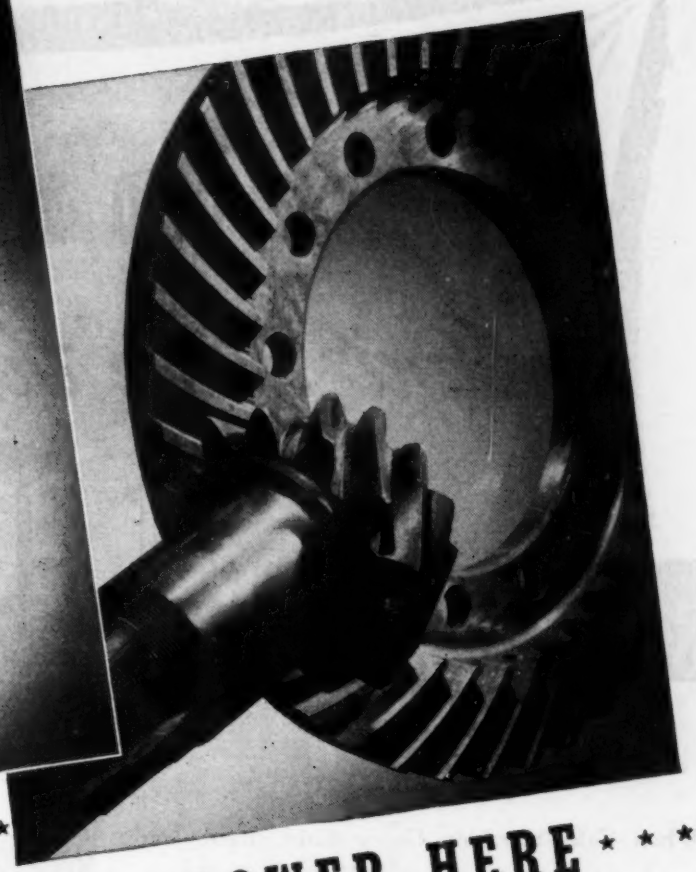

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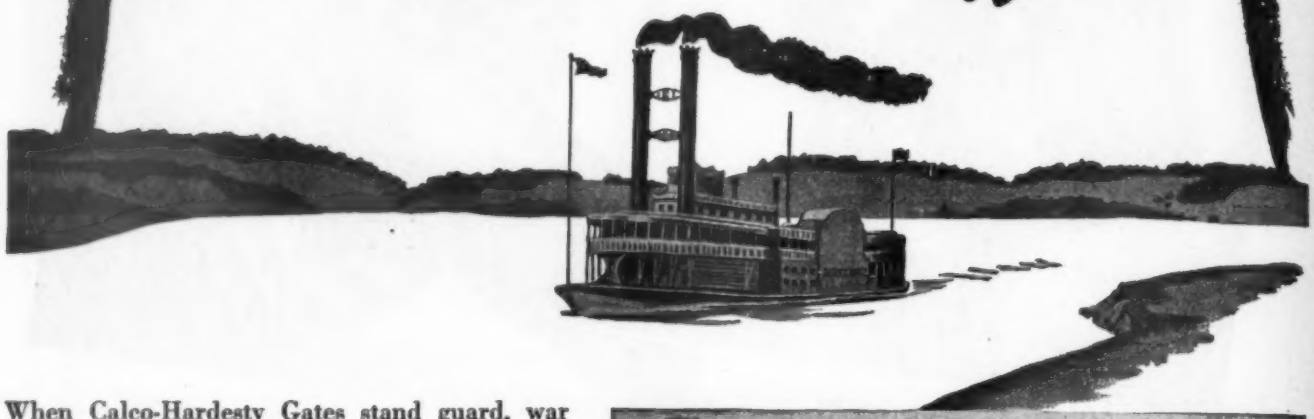

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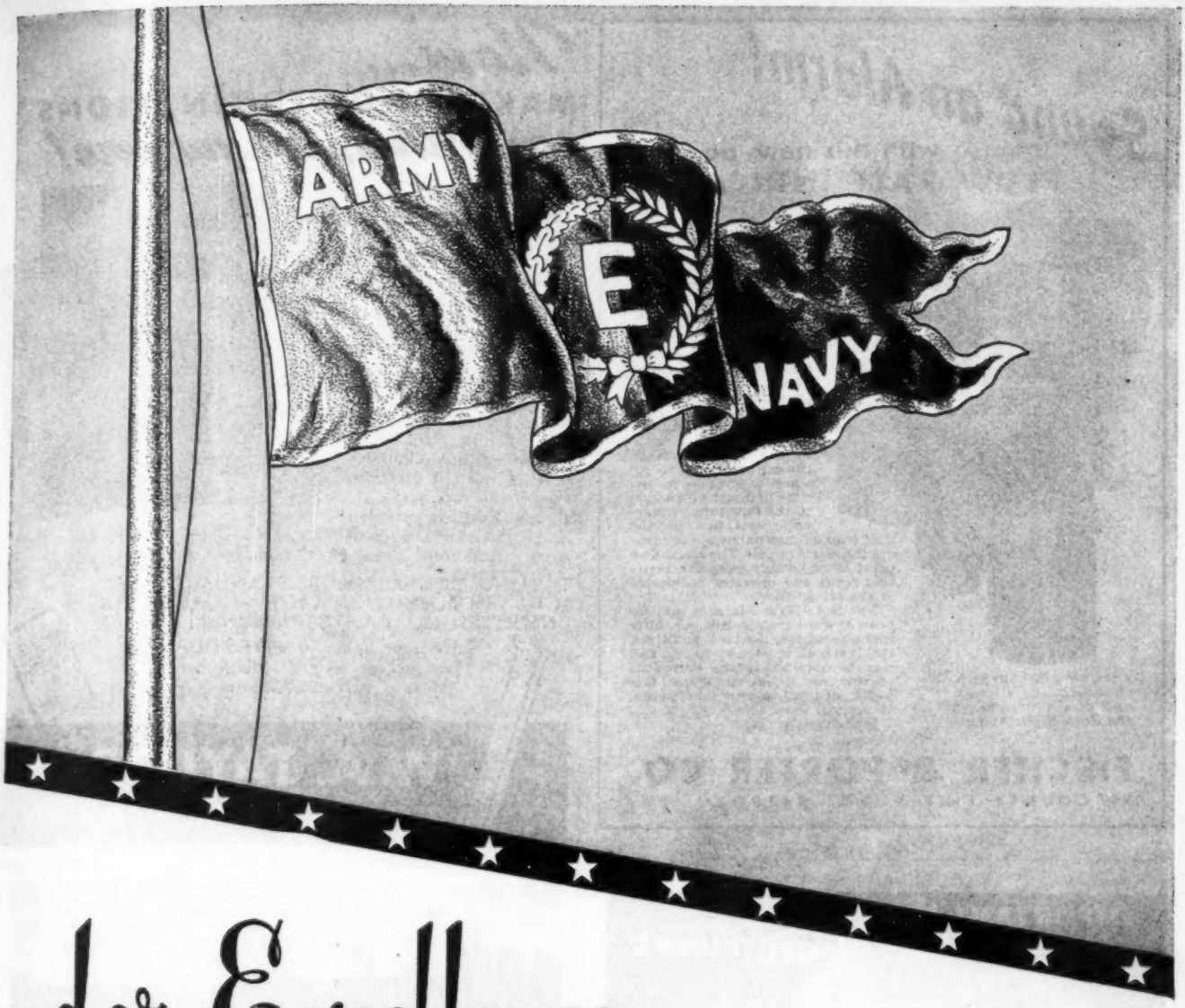

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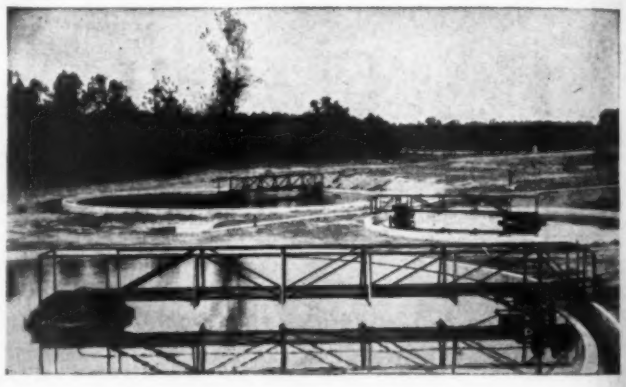

INFILCO PD Clarifiers at an Army Camp

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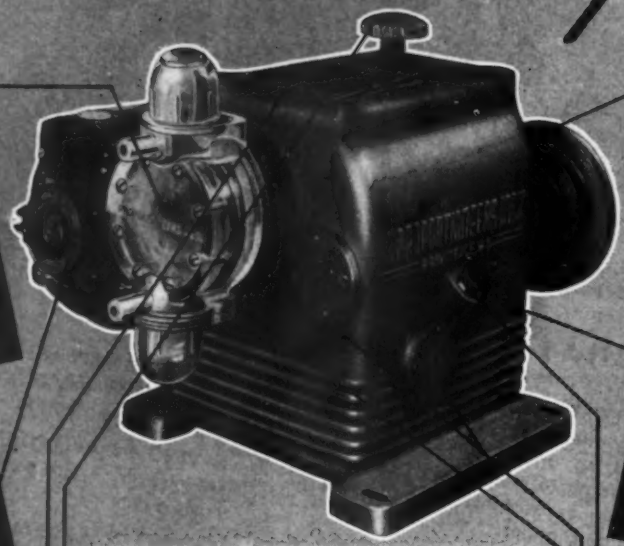

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(b) Built-in twin sight feed domes.
(c) Visible check valve operation.
(d) Patented, fabric reinforced, molded, dished diaphragm. Large enough to allow reasonable stroking rates with resulting long life of all moving parts.
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Standard 1/6 h.p. electric motor available everywhere mounted on swing base for easy belt tension, adjustment provides ample power (Belt drive from your RPM ideal as Chem-O-Feeder has built-in speed reduction).

DOSAGE CALCULATOR
***(For Hypochlorinators)**

No more figuring or hunting for instruction books, delivery curves, etc. Permanently attached to Chem-O-Feeder the "Dosage Calculator" tells all. How to make up solutions. How to set feeder for proper stroke length and stroking rate. All this information for several dosages and many pumping rates.

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Chemical feeding rate may be selected and changed at will while the Chem-O-Feeder is operating by mere twist of chemical feed selection knob which is directly connected to displacement mechanism and observation of visual stroke length indicator. Stroke length indicator dial fully protected by plastic cover.

3 STEP CONE PULLEY

V-Belt drive through 3 step-cone pulleys allows three separate stroking rates in addition to full stroke length adjustment for widest range of feed or dosage.

UNIT FRAME

Enclosing case of one piece cast iron construction makes a rigid frame of great strength and pleasing contour for Chem-O-Feeder mechanism. Mounting holes or slots cast in frame.

OIL FILLER CAP

Chem-O-Feed mechanism operates silently with negligible wear immersed in oil bath. Conveniently filled here. (drain in back)

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Lifetime Ball Bearings immersed in oil bath support all rotating shafts.

WEEP HOLE

Full length bearing with oil seal for push rod prevents chemical from entering Chem-O-Feeder casing in event of diaphragm rupture and forces it out weep hole provided in Plastic Pump Head Mounting Collar.

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Designed by 1000 Waterworks men, backed by % Proportioneer's % experience in over 10,000 successful installations as well as our iron clad guarantee.

Continuous Feed
Adjustable While Operating
Designed for Long Life

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WATER WORKS & SEWERAGE

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E. S. Gillette, Publisher

EDITORIAL OFFICE
155 East 44th Street, New York, N. Y.
L. H. Enslow, Editor

COMING!

"Dependability of Double Check Valve Installations"

Is a review of the actual records of the performance of approved installations of double check valve protection to public water supply, against back-flow from industrial fire service systems into mains of the potable water system. It is regretted that this previously promised article has to be held over for our next issue. The author is—
FRED ALMQUIST, Senior Engr.,
State Dept. of Health, Hartford, Conn.

"Sewage Works Ventilation"

Is the subject of an article revealing design considerations, the features of, and the operating results of the impressively effective ventilating system of the Minneapolis-St. Paul Treatment Works —and in particular the installation serving the Screening and Grit Removal Building. The author and designer is—
GEORGE J. SCHROEPFER,* Chief Engr.,
The Minneapolis-St. Paul Sanitary Distr.
*President of the Sewage Works Federation

"Operating Log and Record Forms for the Small Water Plant"

Represents a composite presentation of log and record forms considered meritorious by three State Sanitary Engineers, two of whom are former plant operators.

"Wartime Meter Repairing"

Is a discussion of the repairing and testing of water meters under wartime conditions but the article will emphasize a method developed for the grinding in of measuring chambers and disc pistons which has proven of marked value in the saving of materials and even whole meters heretofore considered non-repairable. The author who needs no introduction to most of our readers is—
LAVERNE TRENTLAGE,*
Supt. of Meters, Elgin, Ill.
*One of the prize winners in the A.W.W.A. Conference Contest of Supt's. papers.

"A Simplified Flow-Recorder"

Is the invention of a plant superintendent of a simplified flow-recorder of wide range for use in connection with the Parshal Venturi Flame and other low differential producing metering elements. The author and inventor is—
JOHN D. SLOUGH, Supt.,
Sewage Treatment Plant, Wellsville, N. Y.

Superintendents' Prize Papers

Are the two papers which split the first prize for the best reports by superintendents describing "Plant Operations and Improvements to Meet Wartime Conditions." The authors of the prize papers are—
KENNETH K. KING, Director,
Bureau of Water, Kansas City, Mo.
TIMOTHY W. GOOD, Supt.,
Water Department, Cambridge, Mass.

"The Sewage Plant of Cokato"

On the front cover of our February issue appeared the picture of the interesting small town plant of Cokato, Minn., as a "Main St. Plant of 1942." This novel, compact and attractive-appearing plant under one roof is now to be described. The same article will reveal the unique and economical method of treating corn-canning wastes through waste impounding in a lagoon and purification by recirculation through a high-rate, high-capacity trickling filter and eventual dumping of the purified lagooned waste. The author and plant designer is—
W. E. KING, Consulting Engineer,
Toltz, King and Day Engrs., St. Paul, Minn.

"The Newer Materials for Water Works Use—Today and After the War"

Is the subject of a paper presented before the recent A.W.W.A. Wartime Conference in Cleveland. The discussion covers not alone the newer and so-called substitute materials which have been employed since the war in water works maintenance and operation, but also takes a look into what may be expected as offerings of manufacturers of water works materials after the war. The author of this "stock taking" paper is—
W. VICTOR WEIR, Supt.,
St. Louis County Water Co., University City, Mo.

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WATER WORKS & SEWERAGE

VOL. 90, No. 7 *A Gillette Publication* JULY, 1943

ENLARGEMENT OF DISPOSAL PLANT OF SPARTANBURG, S. C.

Made Necessary to Provide Treatment of Camp Croft Sewage

By GEO. W. WHITE
Engineer
THE HARWOOD BEEBE CO.
SPARTANBURG, S. C.

THE city of Spartanburg, South Carolina, together with the adjacent industrial communities, had a population of approximately 50,000 inhabitants in 1940. The following year Camp Croft, an infantry replacement center, was established about four miles east of the city. The camp soon had its full complement of men, and the presence of such a number at the camp also brought an appreciable increase in population to the city itself.

Spartanburg, and most of the adjacent industrial communities, dispose of their sewage through two plants constructed in 1931. The larger plant (Fairforest Creek) treats approximately two-thirds of the sewage. The rated capacity of this plant is 3,000,000 gallons per day, and the sewage flow when the camp was established was between 1,500,000 and 2,000,000 gallons.

Arrangements with Army to Treat Camp Sewage

The Fairforest Creek Plant consisted of a bar screen, double primary clarifiers, trickling filters with twin dosing tanks, final clarifier, three sludge digesters, sludge drying beds, operating house and appurtenances. The filters are of the conventional type, being of standard design with fixed nozzles. All units except the drying beds are mechanically equipped. It was thought this plant would be able to handle the sewage from Camp Croft which was located a reasonable distance from it. Therefore, arrangements were made with the Army to treat the camp sewage, an estimated 1,000,000 gallons per day. However, by the fall of 1941, the camp sewage had exceeded 1.5 m.g.d. and the city's sewage had increased to 2.0 m.g.d. Besides this, the peak flows exceeded the rate of 5.0 m.g.d. almost daily and for periods lasting as much as 6 hours a day. The result was an overloading of the plant, especially as to sedimentation, which in turn placed an extra load on the filters. It soon became evident that enlargement of the plant was necessary.

Additions Constitute An Auxiliary Plant Operating in Parallel

After considerable discussion with government departments and city officials, it was decided to enlarge the plant so as to treat an additional 2,000,000 gallons of sewage daily; the work to be done under the auspices of the U. S. Army and the Federal Works Agency. The additions in reality constitute a new plant paralleling the original facilities.

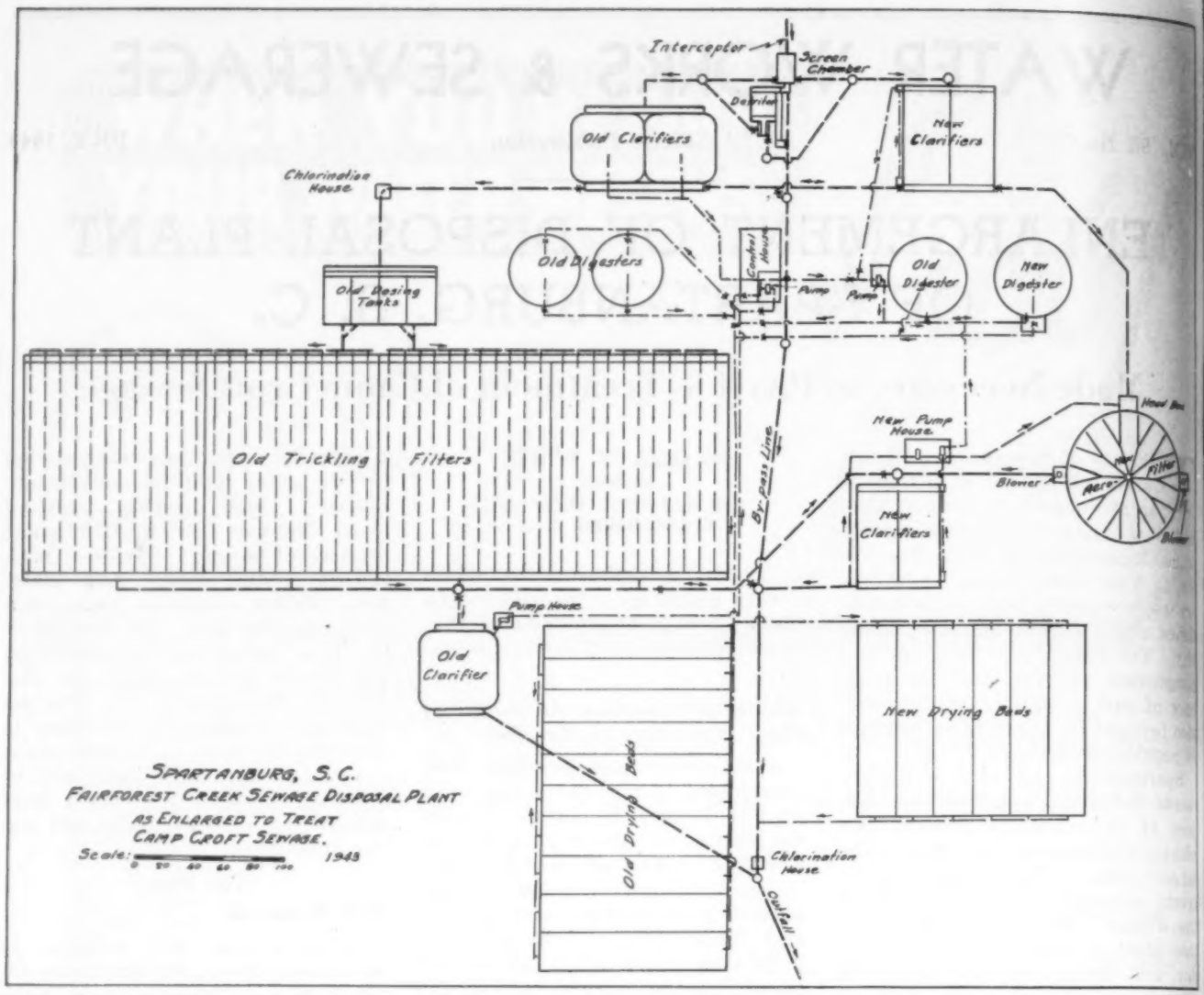
Careful attention was given to present conditions and to the probability of removal of the camp after the war. The latter condition called for the greatest economy possible consistent with efficient treatment at present. These considerations led to designing the improvements around a high capacity trickling filter. The new section of the plant consists of primary clarifiers, high capacity "Aero-filter," final clarifiers, sludge digestion tank, and sludge drying beds. The filter is of the type introduced by Halvorsen and Smith and developed by The Lakeside Engineering Co. The design and operation of this filter is the principal point of interest about the plant, as other units are of customary design. However a brief description of those units will not be out of place.

The Plant

Grit Removal

A mechanical grit collector to serve both plants and handle the entire flow was installed to replace the old, hand cleaned grit chambers. This is a Dorr Co. detritor, having a diameter of 16 feet, designed to handle an 8 m.g.d. peak flow with six inches over the effluent weir. This high peak flow is occasionally

General View Enlarged Fairforest Creek Plant, Spartanburg, S. C.

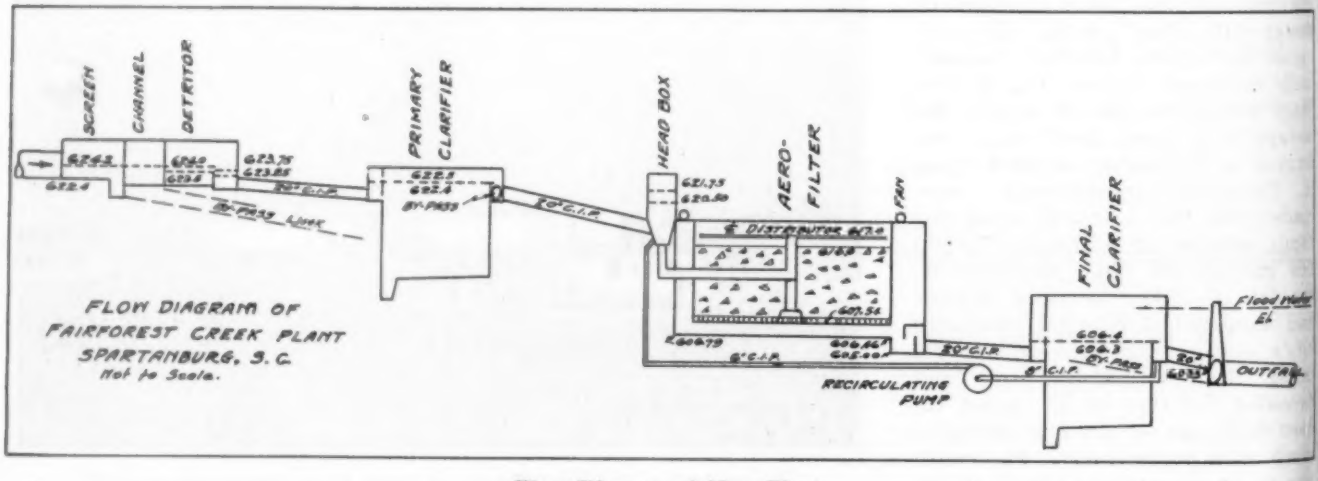


General Plan of Old and New Plants

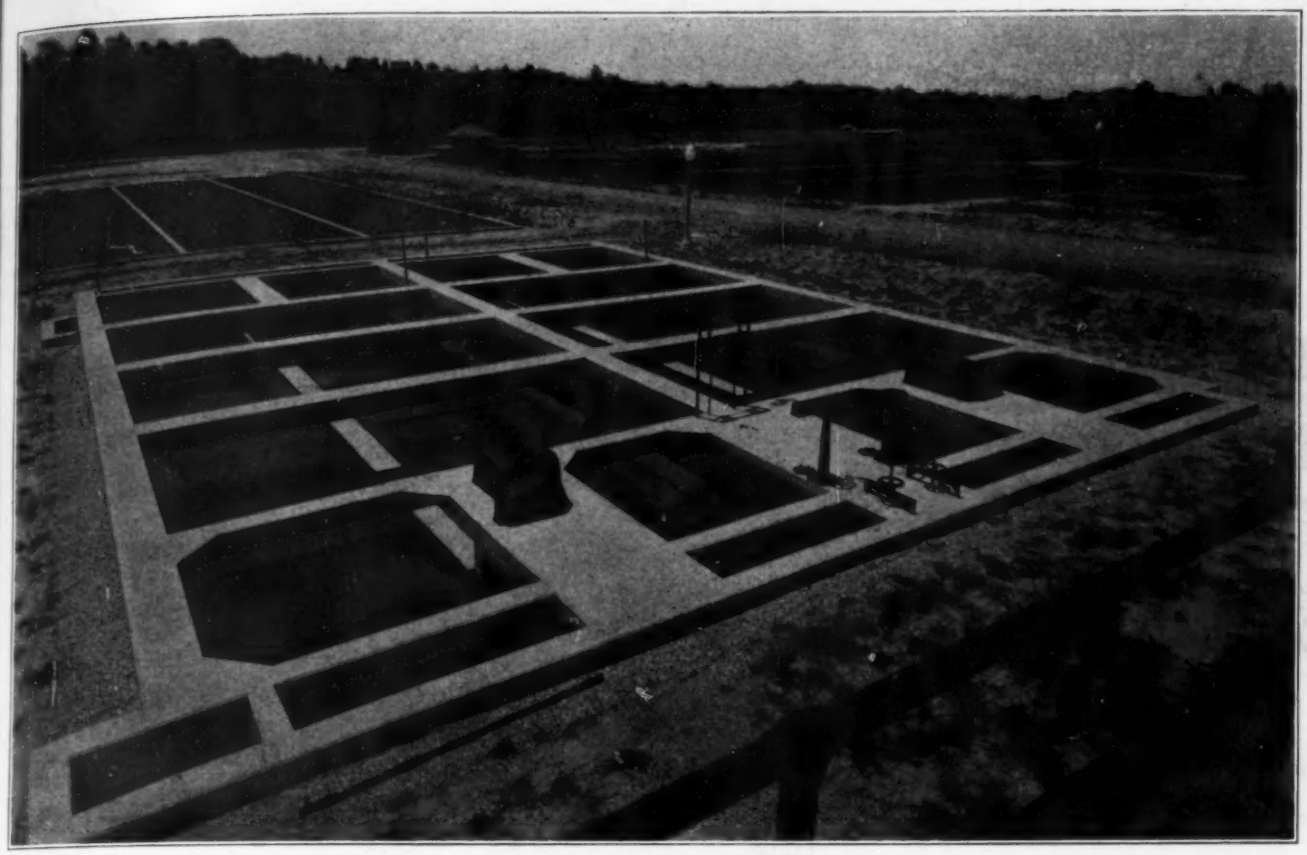
Revealing Design for Flexible Parallel Operation of Conventional and High Capacity Trickling Filters.

reached on account of infiltration of storm water in the old collection system. The equipment consists of rotating arms and scrapers, washing and removing rake, and organic return pump, all driven by motors controlled by a bank of switches set on the concrete structure. Beyond the main weir a channel 7½ feet long with a weir on each side provides for distribution of flow between the old and new clarifiers. One weir is manually adjustable so as to properly divide the flow between the two sections of the plant.

A Venturi meter was placed in the line to each clarifier to indicate and record the flow. One of these had been in service for eleven years in the original plant, and when the tube was moved to its new location



Flow Diagram of New Plant



Twin Final Clarifiers
Twin Primary Clarifiers Are Essentially of Same Design and Similarly Equipped as to Mechanism.

it was found to be in perfect condition.

An Aero-filter requires a relatively high flow at all times, and re-circulation is used at times of low flow to maintain the desired minimum rate through the filter. In order to reduce the amount of re-circulation, openings were left below the weir of the distribution channel on the side toward the new plant, so that the bulk of the low flow at night goes to the Aero-filter. Distribution at normal flows is controlled by the adjustable weir. By this arrangement pumping for re-circulation is held down to a minimum.

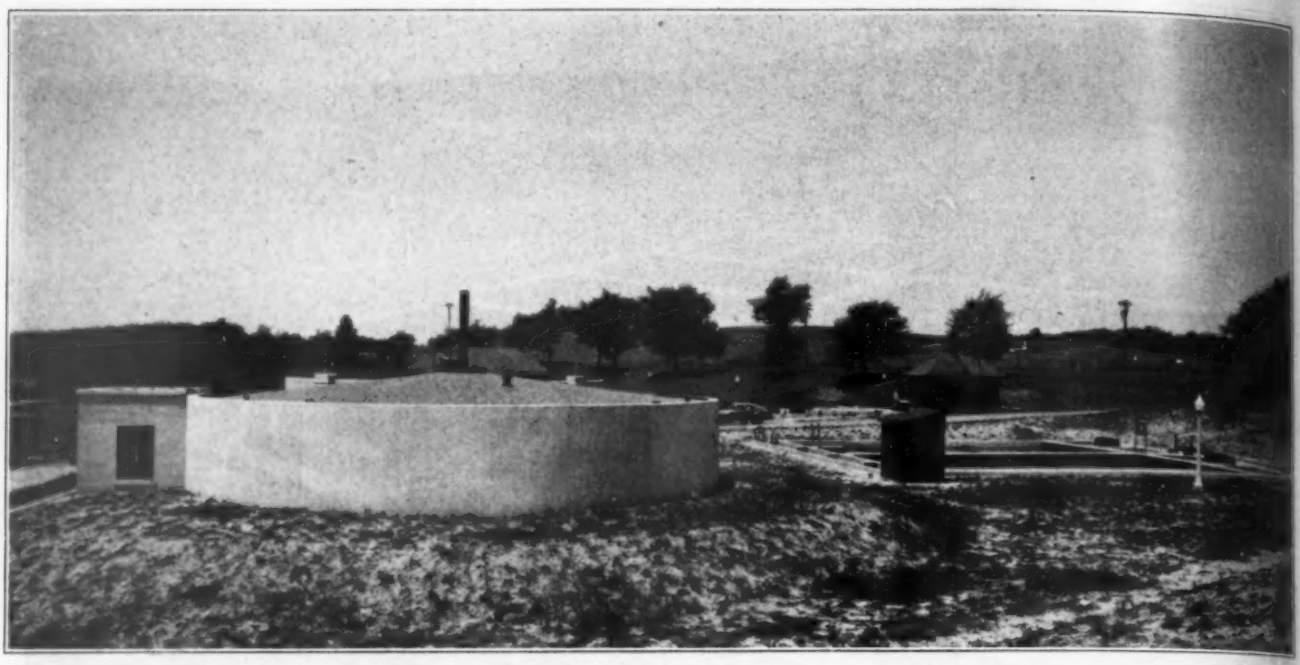
Primary and Final Clarifiers

The primary and final clarifiers are similar in design, each consisting of duplicate basins, in each half of which "Rex" sludge collecting and skimming units provided by Chain Belt Co. are installed. These are of the chain drag type arranged for skimming, with cross collectors at the influent end, thus requiring only one shallow sludge hopper for each half of the tank. Revolving scum pipes are provided at the effluent end of both clarifiers. These are steel pipes set across the tanks with slots in their tops just above water level. They are supported in wall bearings so they can be turned to draw off the scum. One end opens through the wall for discharge into a scum box. From here it flows to the sludge inspection box. Skimming of final clarifiers is unusual, but operation of the old plant indicated the need of skimming in the final as well as the primary clarifier.

Sludge and scum are withdrawn through open concrete boxes about two feet by three feet in plan, constructed integrally with the clarifier wall. Thus the material being withdrawn can be inspected visually as it passes through these boxes, enabling the operator to control the withdrawal more easily than by the usual inspection at the sludge pump.

The effluent weir of the primary clarifier is straight, but for the final clarifier it is in the form of a rectangle, thus providing a much longer weir for the final effluent.

High Capacity "Aero-filter"
(*Diameter* 84 *ft.—Depth* 8 *ft.*)



Floating Cover Digester and Twin Primary Clarifiers Beyond on Right

The hydraulic design of the two clarifiers is shown below:

	Primary Clarifier	Final Clarifier
Dimensions, each unit	29'x67.5'x10.0'	25'x62'x9.0'
Capacity	146,812 gal.	104,625 gal.
Retention period at 2 m.g.d.	3 h. 30 m.	2 h. 30 m.
Over-flow rate at 2 m.g.d.	706 gpd/sf.	645 gpd/sf.
Length of weir	26 ft.	53 ft.

The primary clarifier was over-designed to offset a deficiency in the primary clarifier of the old plant. By dividing the flow properly between these units, the retention period in each is 2 hrs. 30 min. at rated capacity for the whole plant. Part of the effluent from the new clarifiers is diverted to the old dosing tanks through a connecting pipe line, so as to maintain proper distribution on the old and new filters. This diversion is controlled by a wooden stop gate placed in one of several slots in the sides of the effluent channel.

The Aero-Filter

The Aero-filter was designed on the following basis:

Average daily flow	2 m.g.d. or 1390 g.p.m.
Maximum hourly flow	3 m.g.d. or 2085 g.p.m.
Peak (storm) flow	4 m.g.d. or 2780 g.p.m.
Max. peak dosage rate	31 m.g.a.d.
Min. dosage rate	13 m.g.a.d.
Max. hourly dosage rate	23.3 m.g.a.d.
Average BOD, Raw Sewage	330 p.p.m. or 5500# per day
Average suspended solids	310 p.p.m.
BOD Loading per acre ft.	3675 lbs.
Reduction in BOD, final	90%
Reduction in S.S. final	92%

The BOD and suspended solids of raw sewage were taken at average determinations during recent months.

The filter is designed to handle the entire range of flow, using a recirculating pump to maintain the minimum flow, but not otherwise. The area required to handle the maximum rate is:

$$4/31 \text{ acre} = 0.128 \text{ acre} = 5580 \text{ sq. ft.}$$

Assuming 35 per cent of the BOD of the raw sewage to be removed by the primary clarifier, the depth of filter medium required is:

$$\frac{.65 \times 5500}{0.128 \times 3675} = 7.6 \text{ ft.}$$

To meet the above requirements a filter 84 ft. in diameter and 8 ft. deep was constructed. The filter medium is broken granite, graded so that 95 per cent would be 2 inch to 3½ inch stone. Fine stone was very carefully eliminated. This grading provides large contact area and at the same time ample space for ventilation of the bed.

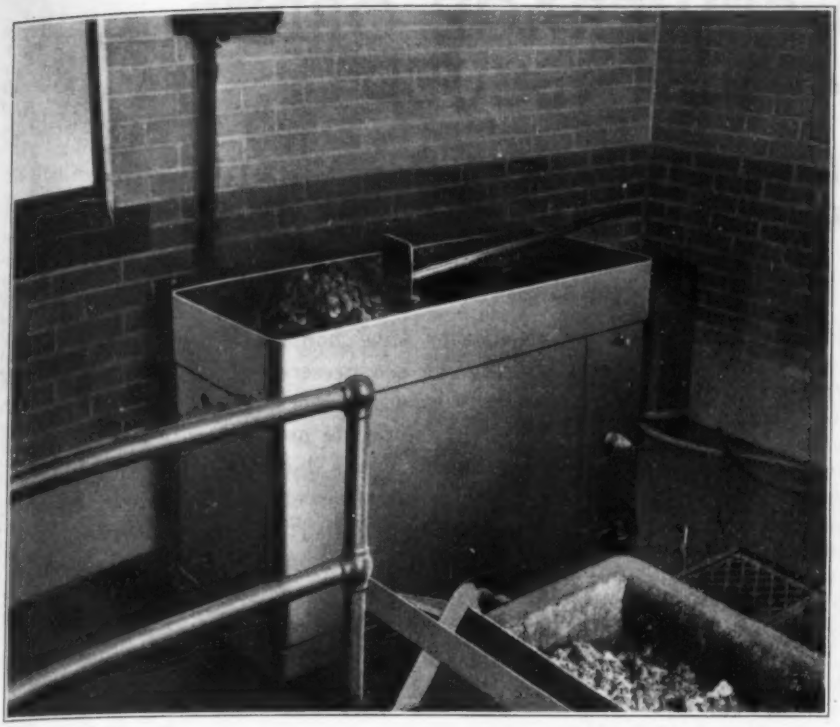
Recirculation

The minimum flow desired on the filter at 13 m.g.a.d. is 1150 g.p.m. and the night flows at the plant drop as low as 1000 g.p.m., part of which would normally go to the old plant. A recirculating pump was therefore provided having a capacity of 700 g.p.m. This pump will maintain the desired minimum rate with as little as 450 g.p.m. of sewage reaching the plant, and will not at any time raise the rate above 1850 g.p.m. or 21 m.g.a.d.

The pump is controlled by a float switch at the head box of the filter, a chamber 8 ft. square and 7 ft. deep into which both settled sewage and returned plant effluent are discharged. The water level in this chamber fluctuates with the amount of sewage going to the filter, the head on sprinkler arms varying from 3.5 ft. at 13 m.g.a.d. to 4.75 ft. at 31 m.g.a.d. The float switch is adjusted to automatically start the pump when the sewage flow falls below 1150 g.p.m. and to stop it at 1850 g.p.m.

Ventilation

Ventilation is an important item in any trickling filter, and especially for one of the Aero-filter type. When air and sewage temperatures are more than 10 degrees apart gravity circulation of air is sufficient. But within that limit forced circulation is necessary, one c.f.m. per square foot of filter area being desirable. For the 84 ft. filter two blowers of 2770 c.f.m. were provided. They are set in air tight housings and pull the air down through the filter and out through the under drains and effluent channel. A water seal trap



"Rex" Triturator
Shreds Coarse Screenings.

prevents air from being drawn in through the effluent pipe.

Distribution

Sewage is applied to the filter by a reaction type revolving distributor with ten arms, each branching into two at the mid point. The discharge nozzles are of the centrifugal sprinkler type, and are adjustable. At minimum flow, sewage is applied to 10 per cent of the filter area momentarily, and the interval between overlapping applications is only 3 seconds, the speed of the distributor being two revolutions per minute. This, and the sprinkling effect of the nozzles make an almost continuous application to the filter surface.

The clarifiers and filter were designed to give a reduction of 90 per cent in BOD and 92 per cent in suspended solids, based on the average raw sewage conditions given above. The plant has not been in operation long enough to warrant publication of results, but apparently the intended performance will be realized.

The equipment for the Aero-filter was furnished by Chain Belt Co. of Milwaukee, Wis., who also supplied the clarifier mechanisms and the screenings "Triturator."

Flow diagrams of the plant, both in plan and profile are reproduced herewith. They indicate, but not to scale, the relative positions of the structures, and show the flexibility of operation that has been secured. Careful adjustment of pipe sizes and by-pass connections was necessary.

Sludge Digester and Drying Beds

Additional sludge digestion was also necessary, and was provided by a tank 50 ft. in diameter and 20.5 ft. effective depth. It is provided with a Downe's floating cover, furnished by Pacific Flush Tank Co. With the existing digesters, this gives sludge capacity of approximately three cubic feet per capita of contributing population. Sludge is pumped to the digesters, and supernatent liquid and ripened sludge are withdrawn by gravity. All digesters are heated by gas burning boilers. The old digesters are equipped with stirring mechanisms.

Six additional sludge beds were also provided. These are open beds, 20 ft. by 125 ft. each, with crushed stone sub-drainage and concrete bottoms.

Power Generation Planned

The pump house was designed as part of a future power plant to be constructed for generating power from the sewage gas. It is located adjacent to the final clarifier, and houses the re-circulating pump and final sludge pump.

Primary sludge pumps are located in the old operating house and in the control chamber of one digester.

The improvements were designed and construction was supervised by The Harwood Beebe Co., Municipal Engineers, of Spartanburg, S. C. General Contractors were Fiske-Carter Construction Co., also of Spartanburg. Major equipment was furnished by manufacturers mentioned above, all of whom cooperated in design of the respective units.

Frank C. Jordan Passes

Almost half-century with Indianapolis Water Co.

Frank C. Jordan, secretary and assistant treasurer of the Indianapolis Water Co., passed away on the morning of June 26 at the age of 66 years.

Mr. Jordan had been active in the water works and fire prevention fields for many years, and was president of the American Water Works Association in 1924-25, and of the National Fire Protection Association in 1929. He was also an organizer and secretary in 1908 of the Indiana Sanitary and Water Association, forerunner of the Indiana section of the AWWA. In 1912 he was elected its president.

F. C. Jordan

In 1940, Mr. Jordan received the George W. Fuller Memorial Award for outstanding services in the water works field. In 1941, at the Toronto convention, he received an Honorary Membership in the AWWA, with the citation including "...one who has led in his community and in the nation in the promotion of the efficiency of water departments in reducing losses from fire."

He was an ardent exponent and supporter of the inch-mile main method of charging for fire protection, as the fairest known method of encouraging and getting paid for adequate fire protection in conjunction with hydrant rentals. Also to him, next to Godliness, good public relations were always uppermost in his mind.

Frank Jordan started work with the Indianapolis Water Co., as office boy in 1894, successively advancing to clerk, bookkeeper, purchasing agent, then secretary in 1909, and was made assistant treasurer in 1913.

REVISED SEWERAGE ORDER P-141 JUST ISSUED

Old P-141 Order Rewritten Expressly for Maintenance, Repair and Operation of Sewerage Facilities

Issued under date of July 5th. The revised and amended P-141 Preference Rating Order of the War Production Board has come through just in time for its reproduction in this issue, but without time for the desired analysis and publication of interpretative comments which will follow.

This revised and amended edition is predominantly the work of A. M. Rawn, as chief of the new Sewerage and Sanitation Section of the Government Division of the W.P.B. It is plainly to be seen that it was prepared by a sewage works manager for other sewage works managers to operate under. In the first place, the Order P-141 has been revised so as to exclude everything but "Sanitary Sewerage Facilities," the new title giving evidence of as much. As far as allowable the legalistic language has been simplified to present an order which can be interpreted and understood with the greatest ease.

Since neither time nor space permits more at this writing we are presenting the new order in full for study by our readers. We believe that it is to be possible to operate and maintain sewers and sewage treatment works under the new order without permitting public sewerage facilities to suffer as the result of inability to secure materials and supplies essential for the proper maintenance and operation of such facilities, and the adequate protection of the public health.

If in this evaluation any reader disagrees after careful reading of the order, we shall deem it a privilege to hear from him, since it is one of the duties of the writer as consultant to the W.P.B. to aid in securing those things for the sewage works manager which are absolutely necessary for satisfactory plant maintenance and operation.—L. H. E.

PREFERENCE RATING ORDER P-141

(As Amended July 5, 1943)

PART 3209—PUBLIC SANITARY SEWERAGE FACILITIES—MAINTENANCE, REPAIR AND OPERATING SUPPLIES

[Preference Rating Order P-141, as amended July 5, 1943]

Part 3209 is hereby amended by changing the title to read "Public Sanitary Sewerage Facilities—Maintenance, Repair and Operating Supplies".

Section 3209.1 is hereby amended to read as follows:

§ 3209.1 *Preference Rating Order P-141*—(a) *Definitions.* For the purpose of this order:

(1) "Operator" means any individual, partnership, association, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not, located in the United States, its territories, or possessions, engaged in or constructing facilities for the purpose of engaging in, the operation of a public sanitary sewerage system or a public sanitary sewerage system combined with a storm sewerage system, whether or not such operator has applied the preference ratings herein assigned.

(2) "Controlled material" means steel—both carbon (including wrought iron) and alloy—copper (including copper base alloys) and aluminum, in each case only in the forms and shapes indicated in Schedule I of CMP Regulation No. 1.

(3) "Material" means any commodity, equipment, accessory, part, assembly or product of any kind.

(4) "Maintenance" means the minimum upkeep necessary to continue an operator's property and equipment in sound working condition.

(5) "Repair" means the restoration of an operator's property and equipment to sound working condition after wear and tear, damage, destruction of parts or the like, have made such property or equipment unfit or unsafe for service.

(6) "Operating supplies" means:

(i) Material which is essential to the operation of the system specified in paragraph (a) (1) and which is generally charged to operating expense account.

(ii) Material for an addition to or an expansion of sewerage system or works, other than buildings, provided that such an addition or expansion shall not include any work order, job, or project, in which the cost of material shall exceed $1,500 in the case of underground sewer or pipeline addition or extension, and $500 in the case of any other addition or expansion and provided that no single construction project shall be subdivided into parts in order to come below these limits.

(7) Material for "maintenance", "repair" and "operating supplies" includes any material which is essential to minimum service standards, and does not include material for the improvement of an operator's property or equipment through the replacement of material which is still usable.

(8) "Supplier" means any person with whom a purchase order or contract has been placed for delivery of material to an operator, or to another supplier.

(9) "Calendar quarterly period" means the several three months of the year commencing January 1, April 1, July 1, and October 1, or the operator's customary accounting period closest to such period.

(10) "Inventory" means all new or salvaged material in the operator's possession, unless physically incorporated in plant, without regard to its accounting classification, excluding, however, material which is segregated for use in additions and expansions specifically authorized under paragraph (e) (2) of this order or by an operative preference rating order or certificate issued by the War Production Board.

(b) *Preference ratings.* (1) A preference rating of AA-1 is hereby assigned to orders to be placed by an operator for material to be used for maintenance or repair, and for operating supplies.

(2) To orders to be placed by an operator for material required for construction of sewer pipelines, manhole structures and pumping stations and equipment and appurtenant works (but not including sewage disposal or treatment plants or plant equipment) to serve a rated project, the lowest rating assigned to such project is hereby assigned, subject to the provisions of paragraph (e) (2) hereof.

(c) *Controlled materials*—(1) *Steel and copper.* Subject to the quantity restrictions contained in paragraph (f) of this order, any operator requiring delivery of any controlled material, except aluminum, for maintenance, repair

or operating supplies, may obtain the same by placing on his delivery order the certification required in paragraph (e) (1) (i) hereof. An order bearing such certification shall constitute an authorized controlled material order.

(2) *Aluminum.* (i) Any operator requiring aluminum in any of the forms or shapes constituting a controlled material, for essential maintenance, repair or operating supplies, where the use of other materials for the purpose is impracticable, may obtain the same from a controlled materials producer or from a distributor specifically authorized by the War Production Board to engage in the business of receiving aluminum for sale or resale, in an amount not to exceed 100 pounds from all sources during any one calendar quarterly period by placing on his delivery order the certification required in paragraph (e) (1) (i) hereof. An order bearing such certification shall constitute an authorized controlled material order.

(ii) Any operator who requires aluminum in any of the forms or shapes constituting a controlled material, in amounts aggregating more than 100 pounds from all sources during any one calendar quarterly period for use as essential maintenance, repair or operating supplies where the use of other material for such purpose is not practicable, may apply for an allotment of the amount thereof in excess of 100 pounds during any one calendar quarterly period by letter address to the Aluminum and Magnesium Division, War Production Board, Washington, D. C., Ref: P-141. The letter should contain substantially the information called for by paragraphs (d) (1) to (6) of Supplementary Order M-1-i, as amended March 10, 1943. If the application is granted, the applicant will receive an allotment number or symbol and may place an authorized controlled material order by endorsing an order with such allotment number or symbol and the certification prescribed in paragraph (e) (1) (i) hereof.

(d) *Restrictions on use of symbol and ratings.* (1) The allotment symbol and preference ratings hereby assigned shall not be used by an operator or supplier to obtain deliveries of scarce material, the use of which could be eliminated without serious loss of efficiency by substitution of less scarce material or by change of design.

(2) The preference ratings assigned by paragraph (b) (1) hereof for maintenance, repair and operating supplies shall not be used to obtain any item included in Lists A, B, or C of Priorities Regulation No. 3.

(e) *Application and extension of ratings; application of CMP allotment symbol.*—(1) *Certification.* (i) The AA-1 rating assigned by paragraph (b) (1) of this order and the CMP allotment symbol MRO-P-141 may be applied by an operator to deliveries of material for use in maintenance, or repair, or as operating supplies only by use of a certification in substantially the following form:

Preference Rating AA-1, CMP Allotment Symbol MRO-P-141. The undersigned purchaser certifies, subject to the penalties of Section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that to the best of his knowledge and belief the undersigned is authorized under applicable War Production Board regulations or orders to place this delivey order, to receive the item(s) ordered for the purpose for which ordered, and to use any peference rating or allotment number or symbol which the undersigned has placed on this order.

.....
Name of operator

.....
S'gnature of designated official

Such certification shall be signed manually or as provided in Priorities Regulation No. 7.

(ii) The ratings assigned by paragraph (b) (2) of this order may be applied by an operator to deliveries of material for use in construction of sewer pipelines, manhole structures and pumping stations and equipment and appurtenant works (but not including sewage disposal or treatment plants or plant equipment) to serve rated projects, by use of the certification provided in Priorities Regulation No. 3 as amended (or the alternative standard form of certification provided in CMP Regulation No. 7): *Provided,* That approval of the construction of such facilities has been granted pursuant to paragraph (e) (2) hereof.

(2) In addition to the requirements of paragraph (e) (1), no operator shall apply the preference ratings assigned in paragraph (b) (2), or segregate material from inventory for the uses described in such paragraph, or accept delivery of material for such uses, until he has first obtained authorization by the War Production Board after filing application at the place prescribed for filing application for authorization to construct the project. If the rated project to be served is or will be owned by Federal Public Housing Authority or if such project is constructed pursuant to an order in the P-55 series, or by an order in the P-19-h series issued to Federal Public Housing Authority as builder, such application for authorization shall be made on Form PD-545. In all other cases, such application, unless otherwise directed, shall be made on Form WPB-617 (formerly PD-200).

(3) The ratings assigned by this order may be extended by a supplier in the manner provided in Priorities Regulation No. 3, and CMP Regulation No. 3.

(4) An order for material other than controlled material, bearing a rating assigned or extended in accordance with this paragraph (e) and a CMP allotment number or symbol shall have the same status as a rated order bearing a CMP allotment number under all applicable CMP regulations. Such number or symbol shall constitute an "allotment number or symbol" for the purposes of CMP Regulation No. 3.

(f) *Restrictions on deliveries, inventory and withdrawals*—(1) *Deliveries and withdrawals.* No operator shall, during any calendar quarterly period, accept delivery of any material or withdraw from inventory any material, to be used for maintenance or repair or as operating supplies or for any other purpose (except material to be segregated for use in additions and expansions specifically authorized under paragraph (e) (2) of this order or by an operative preference rating order or certificate issued by the War Production Board), the aggregate dollar value of which shall exceed the aggregate dollar value of materials used for maintenance or repair or as operating supplies, during the corresponding calendar quarterly period of the year 1942, or at the operator's option, twenty-five per cent of the aggregate dollar value of materials used for said purpose during the operator's fiscal year ending closest to December 31, 1942.

(2) *Inventory.* No operator shall at any time, accept delivery of any material if the operator's inventory will, by virtue of such acceptance, be in excess of a practical working minimum.

(3) *Exceptions.* The provisions of paragraph (f) (1) of this order are subject to the following exceptions:

(i) An onerator who, during the calendar year 1942 (or fiscal year ending closest to December 31, 1942), used for maintenance, repair, and as operating supplies, materials of the aggregate value of not exceeding $1,000 and whose estimated requirements for materials to be used for maintenance, repair and as operating supplies during any calendar year (or corresponding fiscal year) do not exceed $1,000 may, during such year, exceed the quantity restrictions prescribed by paragraph (f) (1) of this order. If the actual requirements of material for maintenance, repair and operating supplies for such year should prove to be in excess of $1,000, such operator shall not accept any deliveries of material or withdraw from inventory any material to be used for maintenance, repair or as operating supplies if such deliveries or withdrawals, when taken together with other deliveries or withdrawals within such year, would, in the aggregate, exceed $1,000. In such case the operator may apply for specific authorization to exceed such quantity restrictions pursuant to the provisions of paragraph (f) (4) hereof.

(ii) An operator may, in any calendar quarterly period, increase scheduled deliveries, and withdrawals of material required for maintenance or repair or as operating supplies over the limits prescribed in paragraph (f) (1) of this order, in proportion to the increase in the load on the system during the preceding calendar quarterly period of the year 1942 corresponding to the calendar quarterly period in question, determined by a measurement of the average daily flow for the two comparative periods: *Provided,* That in determining the average daily flow of sewage, any flow of surface storm water which enters the system shall not be taken into account.

(iii) An operator may, in any calendar quarterly period, accept deliveries of material or make withdrawals from inventory of material, necessary for the maintenance or repair of the operator's property or equipment which is damaged by acts of the public enemy, sabotage, explosion, or fire or by flood, storm or other similar climatic conditions: *Provided,* That if the restrictions of paragraph (f) (1) are exceeded because of such deliveries or use, a full report thereof shall be made within thirty days after such delivery or withdrawal, to the War Production Board.

(iv) An operator may, in any calendar quarterly period, accept delivery of material, having in the aggregate, a dollar value of not more than the dollar value of material of the same class taken from the operator's inventory for delivery to other persons authorized to accept delivery under applicable regulations of the War Production Board but only if, and to the extent that such taking has reduced the operator's inventory of material below a practical working minimum.

(v) An operator may, during any calendar year (or his fiscal year), with-

draw from inventory, material, having in the aggregate, a dollar value of not more than the dollar value of usable material of the same class salvaged from plant during such year.

(vi) The provisions of paragraph (f) (1) and (f) (2) shall not apply to fuel or to chemicals for sewage treatment.

(4) The War Production Board, on its own initiative, or on application of any operator by letter, in triplicate, addressed to the Government Division, War Production Board, Washington, D. C., Ref: P-141, may modify the limitations on practical working minimum inventory, and on scheduling or accepting deliveries, or on use or withdrawals, set forth in this paragraph (f).

(g) *Restriction on construction of sewerage facilities.* No operator shall construct any sewerage facilities, including but not limited to sewer pipelines, manhole structures, pumping stations, sewage disposal or treatment plants and connections, and no operator shall, in case of contract construction, accept deliveries of material for such purposes except as follows:

(1) An operator may construct an addition to or an expansion of, sewerage system or works, other than buildings: *Provided*, That such addition or expansion shall not include any work order, job or project in which the cost of material shall exceed $1,500 in the case of underground sewer pipeline addition or extension, and $500 in the case of any other addition or expansion: *And provided*, That no single construction project shall be subdivided into parts in order to come below these limits: *And further provided*, That in making house connections or extension of line to serve premises, no iron or steel pipe shall be used except the minimum quantities required in making necessary connections.

(2) An operator may construct sewer pipe lines, manhole structures and pumping stations and equipment, and appurtenant works, (but not including sewage diposal or treatment plants or plant equipment) to serve rated projects in which the cost of material is in excess of the dollar limits prescribed in paragraph (g) (1) hereof, if, but only if, the construction of such facilities is authorized by the War Production Board pursuant to the provisions of Paragraph (e) (2) hereof.

(3) An operator may construct sewage disposal or treatment plants and any sewerage facilities other than those referred to in paragraphs (1) and (2) of this paragraph (g), only pursuant to specific authorization by the War Production Board, by the issuance of an order in the P-19 series or other applicable order, pursuant to application on form WPB-617, (formerly PD-200), or in such other form as may be prescribed.

(h) *Sales of material from inventory.* Any operator may sell to another operator, material from seller's inventory in excess of a practical minimum working inventory: *Provided*, That (1) a preference rating of AA-5 or higher assigned by this order or by any preference rating certificate, or (2) a specific direction issued by the War Production Board, is applied or extended to the operator selling such material.

(i) *Audits and reports.* (1) Each operator and each supplier who applies the preference ratings or allotment symbol hereby assigned, and each person who accepts a purchase order or contract for material to which a preference rating or symbol is applied, shall submit from time to time to an audit and inspection by duly authorized representatives of the War Production Board.

(2) Each operator and each such supplier shall execute and file with the War Production Board, such reports and questionnaires as said Board shall from time to time request, subject to approval by the Bureau of the Budget as required under the Federal Reports Act.

(3) Each operator shall maintain a continuing record of inventory and of segregated material in his possession and all material used by him for maintenance, repair or as operating supplies.

(j) *Communications to the War Production Board.* All reports required to be filed hereunder and all communications concerning this order shall, unless otherwise directed by the War Production Board be addressed to the War Production Board, Government Division, Washington, D. C., Ref: P-141.

(k) *Violations.* Any person who wilfully violates any provisions of this order or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States, is guilty of a crime and, upon conviction, may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using material under priority control, and may be deprived of priorities assistance.

(l) *Revocation or amendment.* This order may be revoked or amended at any time as to any operator or any supplier. In the event or revocation, deliveries already rated pursuant to this order shall be completed in accordance with said rating, unless the rating has been specifically revoked with respect thereto. No additional applications of the ratings to any other deliveries shall thereafter be made by the operator or supplier affected by such revocation.

(m) *Applicability of regulations.* (1) Preference Rating Order P-141 is issued in lieu of Preference Rating Order P-46 in so far as it affects public sanitary sewerage systems as defined in paragraph (a) (1) hereof and any reference in any order or regulation of the War Production Board to said Preference Rating Order P-46 shall constitute a reference to orders in the P-141 series.

(2) This order and all transactions affected hereby, except as herein otherwise provided, are subject to all applicable regulations of the War Production Board as amended from time to time, *Provided*, That none of the provisions of CMP Regulations No. 5 or No. 5A shall apply to operators as defined in paragraph (a) (1) hereof, and no such operator shall obtain any material under the provisions of either of said regulations.

Issued this 5th day of July 1943.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

[F. R. Doc. 43-10833; Filed, July 5, 1943; 10:59 a. m.]

Bennett Made City Engineer of Phoenix

Richard Bennett, until recently Hydraulic Engineer in the Water Department of Phoenix, Arizona, has been made City Engineer.

Richard Bennett

Mr. Bennett is a member of the American Water Works Ass'n, and the Federation of Sewage Works Ass'ns. For the past several years he has served as secretary of the Arizona Sewage and Water Works Ass'n. To the readers of WATER WORKS & SEWERAGE he is perhaps best known for his splendid article on "Water Hammer Correctives." (Ref. and data No. June, 1942), amongst others.

NEWWA Names Officers for 1944

The following are the official nominees for New England Water Works Assn. officers to become effective with the close of the 1943 Convention in September.

For President

Horace L. Clark, Sup't., Sanford Water Dist., Sanford, Me.

For Vice-President

Harold W. Griswold, Deputy Chief Eng'r, Water Bureau, Hartford, Conn.

For Director

Arthur C. King, Sup't., Water Department, Taunton, Mass.

For Treasurer

Frank J. Gifford, Cons. Engr., Cambridge, Mass.

Mr. Griswold's nomination is for a period of two years as Vice-president. The vice-president chosen in 1942, and now serving a two year term, is Karl R. Kennison, Chief Engr., Boston Metropolitan Water Commission. Since it is not the custom of the New England Assn., at the time of publishing the names of nominees, to in any manner remind members or others of the fact that the Junior Vice-president automatically succeeds to the office of Senior Vice-president when the new officers are elected, we take this opportunity of mentioning "the forgotten V. P."—Karl R. Kennison.

AWWA'S WARTIME CONFERENCE IN CLEVELAND

Brings Recollections of the Last Cleveland Convention Held Twenty-two Years Ago

THE 63rd Annual Meeting of the American Water Works Association, held in Cleveland, Ohio, June 15-18, brought back some vivid recollections of AWWA activities of an earlier meeting in Cleveland—in fact the last time that the Association convened in this city.

It was just 22 years ago that

President and Pres.-Elect

Sam'l B. Morris, Dean of Engineering, Stanford Univ., Calif. (A.W.W.A.)

Chas. A. McGinnis, Mgr., Pipe Div., Johns-Manville Co., New York (The Mfgr's. Assn.)

AWWA held its 41st Annual Convention in Cleveland. Berkman C. Little, then Superintendent of the Rochester, N. Y., Water Dept., was that year (1921) president of the Association. This was just two years before he was to be chosen Secretary of AWWA as the successor of John M. (Diven). George W. Fuller was there in his prime and just beginning to become the "strong man of AWWA" who soon became its president and memorialized leader, because of his outstanding job of reorganization and revamping of the Association.

For more than one reason this reporter remembers well the Cleveland Convention of 1921. Aside from the importance of this meeting as his first AWWA Convention and the opportunity afforded to see, hear and perchance to meet the shining lights of the water works profession, it held significance in another direction. While the star of one Harry Jordan, Chemist in Charge of Purification at Indianapolis, had begun to glimmer on the horizon of AWWA, the star of a close friend and co-worker was rising rapidly at Cleveland. As the recently made Secretary of the Water Purification Division (in which he was succeeded by Harry Jordan), a relatively little known young assistant sanitary engineer of the Maryland State Dept. of Health stepped into immediate prominence during the 1921 Convention when Abel Wolman was picked to succeed the venerable and esteemed John M. Goodell as Editor of the Association's Journal. Twenty-two years later, upon the next holding of its convention in Cleveland, it was Abel Wolman, President of A. W. W. A., who was steering the Association and planning its destinies through its 63rd Annual Convention.

We were happy, too, to see the same smiling face of "Beek" Little (now Secretary Emeritus of A. W. W. A.) at Cleveland this year, recalling the day 22 years ago when he was in the driver's seat as president of A. W. W. A. Note those names prominent at the Cleveland Convention 22 years ago and what these names stand for today in A. W. W. A.—George W. Fuller, John M. Diven, John M. Goodell, Abel Wolman, Harry Jordan.

Twenty-two years ago at Cleveland the membership was 1540. In 1943 at Cleveland the membership in A. W. W. A. stood at 4785, with a gain of some 400 new members just since the first of the year. Twenty-two years ago one hotel housed the convention and exhibits comfortably. This year two hotels were not sufficient. The official paid registration count of 1131 did not reveal the approximate 1400 or more in attendance. Just why there was not a more complete registration this year of those attending for a day or two has not been ascertained.

Special Guest Speakers

J. Grant Frye, Attorney, Cape Girardeau, Mo. ("We just po'ed it on their sore backs")

Arthur Collins, Westminster, England (Regardless of Bombings Britain Stands Up)

Convention Highlights

Again this year A. W. W. A. was privileged to hear from J. A. Krug,

Vice-Presidents

Sam F. Newkirk, Jr. Engr. & Supt., Water Comm., Elizabeth, N. J.

Chas. A. Becker, Sales Manager, R. D. Wood Co., Philadelphia

Director of the Office of War Utilities, who did such a splendid job of securing the cooperation and goodwill of A. W. W. A. members at the 1942 Chicago Conference in the matter of reducing the use and inventory of critical materials. He flew out from Washington to Cleveland,—and following the "big-boss" Arthur Gorman, Chief of W. P. B's. Water Supply Branch, amplified the talk of Director Krug by reassuring water works operators that their systems were not to suffer to any danger point because of lack of maintenance, repair and operating supplies. Further, that managers should *now* plan for strengthening all systems which might suffer the consequences of deficiency of supply due to possible drought conditions, as well as any anticipated increased demand resulting from the war effort, direct or indirect. Stressing the danger of a critical water supply situation and the consequences of deficiency of supply or service, the W. P. B. spokesmen are pointedly calling for *immediate* advance planning of supply and system betterments for all critical systems. This involves the earliest possible filing

with the Office of War Utilities of a bill of materials to be needed for effecting the desired strengthening of such systems, in order that allocation of the extra requirement of construction materials may be secured under the Controlled Materials Plan, a highly important matter if the availability of necessary material is to be assured for such projects.

J. A. Krug, Vice-Chm. W.P.B., Director of War Utilities

Also, from Washington came A. M. Rawn, Chief of the Sewerage Section of W. P. B., by invitation, to discuss with members the future policy and practice of W. P. B. in respect to materials for maintenance, operation and construction of sewerage facilities.

The Problem of Post-War Planning

Very definitely one of the highest of the highlights of the Conference was the evening Special Session at which Colonel Willard Chevalier and Abel Wolman, as master-speakers discussed in independent style the question of Post-War Planning as it pertains to water-supply and sewerage programs. Both of these speeches, made to an overflowing after-dinner house, are printed in full in this same issue. They are packed with reasoning and suggestion from at least two different viewpoints. As Abel Wolman stated it—"There is at least the certainty that we shall have a post-war period and its problems" — therefore, every water and sewage works man and every community administrator should read carefully the timely discussions of these two keen analysts with such gifts at expression as have Chevalier and Wolman.

Washington Worthies
(Of the War Production Board)

A. E. Gorman, Chief, War Utilities, Water Supply Br.

Lloyd Nelson, Asst. Chief, War Utilities, Water Supply Br.

A. M. Rawn, Chief, Govt. Div's. Sewerage Section

In the same direction another Conference highlight was the action taken by the Board of Directors in the establishment of a Joint Committee on Post-War Planning composed of two members each from the A. W. W. A., the N. E. W. W. A., the Sewage Works Federation, and the Water and Sewage Works Mfrs. Assn. (Since the Cleveland Conference Abel Wolman has accepted the chairmanship of this important committee which, as we go to press, is holding its first meeting in Washington.)

Made Honorary Members

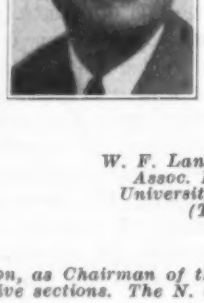
George C. Bunker, Consulting Engineer, Caracas, Venezuela
(Chief Sanitary Engineer, Federal Dept. of Health)

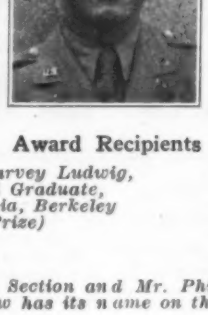
Wm. R. Conard, Engr.-Consultant, Burlington, N. J.

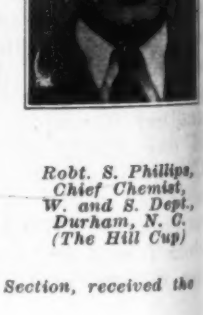
Wm. W. Hurlbut, Asst. Chief Engr., Dept. of Water and Power, Los Angeles

War and Water in Britain

For the first time, many heard it revealed at first hand by an official authority from Great Britain just what water supply meant to England while taking such violent punishment during Hitler's air blitz of English cities. When he completed his talk with the statement that, with it all, "England stood up; and England will continue to stand up!", Mr. Arthur Collins of Westminster, England, representing the British Information Service in America, received resounding applause for his forthright statements and his grateful acknowledgement of the assistance rendered by the United States during the







Award Recipients

Earl Devendorf, State Water Coord., N. Y. Dept. Health, Albany (The Diven Medal)

W. F. Langelier and Harvey Ludwig, Assoc. Professor and Graduate, University of California, Berkeley (The Goodell Prize)

Edgar Johnson, Senior Engr., Minneapolis Water Dept. (The Henshaw Cup)

Robt. S. Phillips, Chief Chemist, W. and S. Dept., Durham, N. C. (The Hill Cup)

Note—Mr. Johnson, as Chairman of the Minnesota Section and Mr. Phillips, as Secy. of the N. Carolina Section, received the cups for their respective sections. The N. C. Section now has its name on the Hill Cup for the fourth time.

Convention Management

Wm. J. Orchard, Gen'l Manager, W. & T. Co., Newark, N. J.

Clinton Inglee, President, Nat'l W. Main Cl. Co., New York

darkest hours of Britain and since.

Without question the most serious bomb hit on a British water main was that in London, when a junction of two large mains suffered a direct hit. Unable to make a prompt shut-off, these mains flooded "the underground" (subway) which was being used by thousands of women and children as supposedly the safest possible bomb shelter. The consequence was the loss of hundreds of lives of those trapped in this flooded subway almost 100 ft underground. Then, in Birmingham 80% of the population at one time was without water. Clydebank, near Glasgow, Scotland, after a concentrated raid had but 10 of its 12,000 homes intact. Here the water mains were thoroughly destroyed. In Coventry 70,000 of its 82,000 homes were hit.

One result of the blitz experiences has been a redesigning of water systems, standardization of hydrant hose connections and better hydrant locationing; and, most important, the establishment of a multiplicity of surface storage tanks and basement reservoirs. That, during all of the disruption of water service and main destruction there had been no epidemic, constituted a great tribute to the water supply authorities and to chlorination provided by emergency stations well scattered all over the cities.

Another result is that local and political boundaries in England have practically all disappeared, in so far as water supply is concerned. For the most part broken mains have been replaced by pipe laid on the surface at the curb, without the expected casualties as the result of this practice. With the record of England-as-a-whole showing a destruction of 1 out of every 5 homes and with the terrific ordeal of the 14-month blitz on London it was astounding to most of us to hear that of London's population of 10,000,000 only 30 persons were consigned to insane hospitals in this period.

New Division Chairmen

Frank C. Amsbary, Jr., Manager, Ill. Water Service Co., Champaign, Ill. (Plant Management & Operation Div.)
A. Clinton Decker, Sanitary Engineer, Tenn. Coal, Iron & Ry. Co., Birmingham, Ala. (Water Purification Div.)
Arthur P. Kuranz, Supt. and Engineer, Water Commission of Waukesha, Wis. (Finance and Accounting Div.)

Superintendent's Competition

A novelty on the program was the Superintendent's Prize Contest on the topic "How 'Our Town' Met the War Emergency" in respect to maintenance and operation of the local water utility. Five of the best papers submitted (chosen by a committee of judges) were presented in Cleveland. The first prize of $50 was split between Kenneth King, Director of Water at Kansas City and Timothy Good, Supt. at Cambridge, Mass. Others in the prize money were "Bill" Schnabel, Supt. at Allentown, Pa., La Verne Trentlage, Supt. of Meters at Elgin, Ill. and H. B. Peterson, Supt. at Marshalltown, Ia. More concerning these papers later. (Another prize contest, not scheduled, was that held by the Directors—the pool formed at $1.00 per head, and the winner to be that individual predicting most accurately the official registration for the Conference. The pool was won by "Wally" Moorehouse, Supt. at Dayton, Ohio, his guess being right on the nose at 1131.)

Presidents

Geo. J. Schroepfer, Chief Engr., Minn.-St. Paul Sewerage Comm. (Sewage Wks. Fed.)

Dan F. McAfee, Gen'l Manager, The Dorr Co., N. Y. City (The Mfg's. Assn.)

Frye Does 'Em Up Brown

The biggest "show" on the program was that put on by J. Grant Frye, a Girardeau, Mo., attorney, who brought down the house in his account of experiences with the water tank reconditioning racketeers, in which the contract inconspicuously calls for replacement of leaking—or faulty rivets at so much per rivet (usually $1.00 each)—during the cleaning and painting job. He recited the experience of his own home town—"little Ilmo, Mo."—(pop. 1150) in which 1250 sound

Richard Messer, Chief Engr., Va. Health Dept., Richmond

W. L. McFaul, City Engr., Hamilton, Ont.

New Board Members

W. M. Piatt, Cons. Engr., Durham, N. C.

M. H. Schwartz, Manager, Vincennes (Ind.) Water Co.

T. L. Young, Manager, S. Side Water Co., Chester, W. Va.

Paul Weir, Asst. Mgr., Water Dept., Atlanta, Ga.

"The Deluge"

A Radio Play written by A. F. Dappert and directed by E. A. Sigworth, doing his stuff in the center view during rehearsal.

THE CAST—Geo. West (Announcer); Doug. Feben (Narrator); Mrs. W. R. La Due (News Reporter); "Bill" Schnabel (The Mayor); "Bob" Phillips (Fairtown's Water Super.); Harry Lendall (Local Doctor); Geo. Turre (Town's Favorite Plumber); "Doc" Berry (Dist. Engr., State Health Dept.). Sound effects par excellence by Cleveland's Johnnie Marsh.

rivets were knocked out and a bill for $3,000 rendered, and payment demanded before the tank would be put back in serviceable condition. While the contract for cleaning and repainting called for the very nominal sum of $185.00, the balance of the $3,000 bill rendered was for the hidden dynamite in the contract covered in a single sentence about rivet replacements, as found needed upon inspection. According to brother Frye, who never has believed in "taking it laying down" since his World War I service, here is where the fun began between some smart operators and a small-town lawyer and City Attorney of "little Ilmo." And it was a good story that he unravelled in the legal maze that the Ilmo case ran into. To make it short Ilmo sued and the case which eventually landed in the U. S. Court was decided on April 29th. In the decision against the U. S. Elevated Tank Maintenance Co. of Memphis, Tenn.. "little Ilmo" was awarded not only the $4,000 direct damages but tacked on was an additional $10,000 cost as "punitive damages".

Mr. Frye pointed out that the U. S. Elevated Tank Maintenance Co. has now changed its name and the same principals are operating the newer Dixie Tank and Bridge Co., with headquarters in Nashville, Tenn. (and many fictitious branch officers), and have begun advertising in the water supply field under the new Dixie name—so beware, Mr. Waterworks man. Mr. Frye also warned that W. A. Riley, president of the Dixie Company is no other than the former William Pietzmann, president of the U. S. Elevated Tank Maintenance Co. before having his name changed through fraudulent methods to Riley. He wondered, incidentally, how the Irish would take this.

[In the direction of supplying a guide to water works superintendents and others, the A. W. W. A. Committee on Steel Standpipes and Elevated Tanks (L. R. Howson, Chmn.) has recently had printed a pamphlet of "Suggestions for the Preparation of Specifications Covering the Repainting of Elevated Steel Tanks and Water Storage Reservoirs, with notes on repairs". Any reader who is considering entering into a contract for repainting and/or repair of a steel tank should request of the Association a copy of this pamphlet which was presented during the Cleveland Conference as a committee report by Mr. Howson. Had Ilmo, Mo., and many others who have suffered at the hands of unscrupulous tank maintenance contractors, followed the suggestions in this report regarding tank inspection and repairs when contracting for tank maintenance work there would have been no need for such litigation as Mr. Frye has so successfully carried through the U. S. Court to prove that these tank maintenance racketeers can be dealt with in a fashion so deserving the type of outfit that has been preying on the small towns and institutions, while being smart enough to realize that they couldn't get away with such a racket in the larger cities where more experienced and less gullible individuals are employed to manage the water supply system and other public utilities. At some extra expense to the Association the two-fisted go-getting Girardeau, Mo., attorney, J. Grant Frye, was brought to Cleveland to prove that all others who have suffered at the hands of such tank wrecking racketeers can also enjoy their day at court if so minded. The part of this story that seems difficult to comprehend is the fact that an individual or a company who have been found guilty in the eyes of the U. S. Supreme Court to the extent that the fraud committed has been considered sufficient to warrant a judgment of $10,000 in "punitive damages" on top of the actual damage award can remain in business and continue to advertise his trade in official Municipal League magazines and at least one business publication of repute in the water works field.]

Hosts in 1944

Milwaukee's
Herbert H. Brown, Supt. of Water,
Jos. P. Schwada, City Engineer,
(Came intent on getting the 1944 Conference—and did.)
Leon A. Smith, Supt. of Water,
Madison, Wis.
(Secretary of the Wisconsin Section)

Fluorides Now Considered Beneficial to Teeth

In the Water Purification Division the most interesting disclosure was that of the medical man who now finds that there is in many instances actual need for fluoride in drinking water, when, until very recently, fluorides in any amount in potable waters were considered something to avoid if possible and water purification men have been seeking methods for as nearly complete fluoride removal as practicable. Fluoride deficiency is now considered responsible for aggravated tooth decay amongst children, whereas fluoride in excess of 1.5 parts per million (Fl.) is responsible for mottled enamel of children's teeth. So the question occupying the minds of public health authorities and water purification men is that of possible "Fluorination" of waters showing fluoride deficiency. To this topic a full half day session was devoted and water purification men learned of the projected full scale demonstration program of

"Lovely to Look At"

(1) Lieut. Dorothy Ledgerwood (Chicago) formerly of "Water Works and Sewerage"; (2) Mrs. Jim Brown of Chicago; (3) Charlotte Drake (Buffalo), the apple of Alan D's eye; (4) This Birmingham beauty is Mrs. Ralph Silver; (5) Mrs. Tom Henry of Toledo.

The Lindy Harpers of Omega, Kansas City

The R. W. Sparlings of the one and only, Los Angeles

Mrs. Clint Inglie, (N. Y.) Mrs. Byron Payne, (Ky.) Mrs. Abel Wolman, (Md.) Mrs. Bill Lovejoy, (Ky.)

The Earl Devendorfs who took home the Diven Medal, Albany, N. Y.

The Jeff Corydons of Chem-Feeds, Providence, R. I.

"Fluorination" of a public water supply in New York state.

"The Deluge"—A Radio Play

Another novelty on the program was the radio play acted by a group of water works men and one "water works lady"—all being named in the cast listed in the caption of a strip of pictures taken during the rehearsal of "The Deluge", the script for which was written by A. F. Dappert and the show directed by E. A. Sigworth.

Honors and Awards

At the Annual Dinner, presided over by the new president, Sam Morris of Palo Alto, Calif., the following honors were conferred and awards made:

Honorary Memberships were conferred on George Cyrus Bunker, of Caracas, Venezuela; Edward Smith Cole, of New York City; William Roberts Conard, of Burlington, N. J.; William Whitehead Hurlbut, of Los Angeles.

The John M. Diven Medal was presented to Earl Devendorf, of Albany, N. Y., in recognition of his outstanding work as State Water Coordinator for New York and leadership in developing the Mutual Aid Plan in the state.

The John M. Goodell Medal was presented to Wilfred F. Langelier, of the University of California, and Harvey F. Ludwig, who received the award, for their joint paper, "Graphical Methods for Indicating the Mineral Character of Natural Waters". (Journal of A. W. W. A., March, 1942.)

The George W. Fuller Awards were presented to—

Recipient	*Section*
Carl M. Hoskinson	(California)
*Norman J. Howard	(Canadian)
John R. Hoy	(Florida)
Seth M. Van Loan	(Four States)
*Louis R. Howson	(Illinois)
*Cecil K. Calvert	(Indiana)
*Claude M. McCord	(Ky.-Tenn.)
Edward D. Rich	(Michigan)
Arthur F. Mellen	(Minnesota)
*W. Victor Weir	(Mo. Valley)
Eugene Carrol	(Montana)
*Sam'l F. Newkirk Jr.	(New Jersey)
*Earl Devendorf	(New York)
*W. McK. Franklin	(North Caro.)
*Chas. P. Hoover	(Ohio)
Chas. C. Casad	(Pacific N. W.)
Delbert P. Porter	(Rocky Mtn.)
Leonard O. Williams	(Rocky Mtn.)
*Borden P. Rice	(Southeastern)
*Egmont S. Smith	(Southwest)
*Eugene F. Dugger	(Virginia)
*Myron G. Mansfield	(Western Pa.)
*Mentos Hetzer	(West Va.)
*William U. Gallaher	(Wisconsin)

* Recipients present to receive the award in person. In this group are three past-presidents of the Association, N. J. Howard, L. R. Howson, E. F. Dugger.

North Carolina Wins Hill Cup for Fourth Time

The Nicholas S. Hill Cup which is awarded annually to that Section showing the best record during the year in membership gains was presented to Robert S. Phillips of Durham, N. C., as Secretary of the N. C. Section. This Section deserves special recognition as the winner of the Hill Cup, for the inscribed history on the trophy up to this year's winning shows the N. C. Section as three times its winner under the old as well as the new and more scientific rules in computing the best membership gain record—not in total numbers, but in the highest percentage-gain considering the potential membership from the area served by the section. This winning puts North Carolina's name on the cup for the fourth time, which constitutes a "quota" for others to aim for.

Second to North Carolina came the Southwest Section, which with its noteworthy gain in new members as the result of a live-wire membership getting committee, headed by L. A. Jackson of Little Rock, Ark., would have won under the old rules, only to be nosed out because of the large urban population within the four states embraced by the Southwest Section. We would definitely vote

Presidential Stuff

(1)—*One of the President's breakfasts at which the speakers of the day were guests in the Presidential Suite.*
(2)—*President Elect Sam Morris and Retiring President Wolman discuss some post-conference planning for A.W.W.A.*
(3)—*President "Sam" takes over at the closing banquet and presents the awards.*

Gene Dugger (Newport News), Alan Drake, Buffalo's Director of Water, Mrs. Alan and Miss Charlotte

Ed. Johnson, Supt. of Water, Raleigh, N. C. Mac Williams, Supt. of Water, Durham, N. C. and "Miss Cleveland"

The Floor Show during the President's Reception Tuesday night

W. B. Harman, Asst. Mgr., Newport News, Va. W. W. Winfree, Glamorgan Fdy., Lynchburg, Va. ("Miss Cleveland" again)

Jim Turner, Supt., East Providence, R. I. Walter Shea, Ch. Engr., R. I. Dept. of Health, Providence ("Miss Omaha")

(1)—*Something of a traffic jam was experienced in registration of most of the* 1131 *registrants the first morning.*
(2)—*"Bill" Hurlbut and "Jim" Barker in their perennial stunt of taking back to California the "Old Oaken Bucket" (genuine product) claimed by the largest section.*
(3)—*The first breakfast of Fuller Award winners.*

the Southwest's Committee a "big hand" of applause in lieu of a consolation prize of some sort.

The Henshaw Cup to Minnesota

The Franklin Henshaw Cup is annually awarded the Section which records the lowest percentage of non-members attending its meetings during the year. The winning Section was Minnesota for which Edw. W. Johnson, of Minneapolis, as immediate past-chairman and Minnesota's National Director, acted in receiving the award.

California Keeps the Bucket

Californians must be becoming weary of toting back home year after year that genuine "Old Oaken Bucket" from a New England farm well. For the California Section "Bill" Hurlbut received this trophy again, all because the New York Section wasn't able to build up its membership total to closely approach that of the Californians, much less beat it.

New Division Officers

The three Divisions elected the following as officers for the ensuing year.

The Plant Management Division

Chairman: Frank C. Amsbury, Jr., Urbana, Ill.

Vice-chairman: Lloyd Rebsamen, Jonesboro, Ark.

Sec'y-Treas.: Herbert H. Brown, Milwaukee, Wisc. (winner of the 1944 Conference for Milwaukee).

Directors: S. S. Anthony, Augusta, Me.; M. Pequegnat, Kitchener, Ont.

The Water Purification Division

Chairman: A. Clinton Decker, Birmingham, Ala.

Vice-chairman: Geo. J. Turre, Denver, Colo.

Sec'y-Treas.: Chas. R. Cox, Albany, N. Y.

Directors: M. C. Smith, Richmond, Va.; C. K. Calvert, Indianapolis; G. M. Fair, Cambridge, Mass.

The Finance and Acc't'g Division

Chairman: Arthur P. Kuranz, Waukesha, Wisc.

Vice-chairman: Geo. B. Schunke, Seattle, Wash.

Sec'y-Treas.: Carter H. Lamb, Jamaica, N. Y.

Directors: W. V. Weir, St. Louis; G. F. Hughes, Denver.

New Board Members

The following became new members of the Board of Directors for three year terms with the closing of the Cleveland Conference, following which the new board held its first meeting.

B. V. Howe — Rocky Mountain Section.

Arthur P. Kuranz — Wisconsin Section.

Wm. L. McFaul—Canadian Section.

Richard Messer—Virginia Section.

Wm. W. Piatt—North Carolina Section.

M. H. Schwartz—Indiana Section.

Paul Weir—Southeastern Section.

Thos. L. Young—West Virginia Section.

*Chas. A. McGinnis—New York City.

*Mr. McGinnis, who becomes the next President of the Water and Sewage Works Mfgrs.' Ass'n., was elected by the manufacturers also as their representative on the Board. All new Board members, with the exception of the Rocky Mountain Director, were in attendance.

The last act of the new board was the approval of the recommendations of the Convention Place Committee in its choice of Milwaukee as the Conference City for 1944. The meeting will be held—*Deo Volente.*

The Cleveland Conference Technical Sessions are to be the subject of digest reports scheduled for our next issue.

H. F. Blomquist, Supt., Cedar Rapids, Ia. Thos. J. Skinker, Comm. of Water, St. Louis John Klein Lenz, Indianapolis Water Co., Publicity Dept.

Frank Miller, Asst. Engr., (Secy. Va. Section) Richard Messer, Chief Engr., Va. State Dept. Health Marsden Smith, Chief Engr., Dept. Utilities, Richmond, Va.

"Four Stripers" J. K. Hoskins and Ralph Tarbett, Captains, U.S.P.H.S. and A. M. Rawn, Chief, Sewerage Section WPB, Washington

"Cy" Bird, Chicago, E. Shaw Cole, Ch. Engr., The Pitometer Co. and "Bill" Schnable, Supt., Allentown, Pa. (Center)

"Casey" Jones, Sales Mgr., Simplex Meter Co. "Bill" Piatt, Cons. Engr., Durham, N. C. Frank Roe, Carborundum Co., Niagara Falls

Martin Symons, Chief Engr., Interstate Water Co., Danville, Ill. "Bill" (W. T.) Birch, President, Birch Mfg. Co., Chicago

Richard Ellis, Engr., Factory Mutual Ins. Co., Boston Geo. Tatnall, Engr., Bd. Fire Underwriters, Chicago

Melvin P. Hatcher, Supt. & Ch. Engr., and Wm. T. Bailey, Ch. Chemist, Dept. of Water, Kansas City

"Reggie" Hayes, Hydraulic Devel. Co., Boston and "Herb" Crowell, Rennselaer Valve Co., Boston

Wm. R. Schnabel, Supt. of Water, Allentown, Pa. "Bob" R. W. Turner, Phila. Manager, Rennselaer Valve Co.

THE IMPACT OF POST-WAR PLANNING ON PUBLIC WORKS PROGRAMS*

By COL. WILLARD CHEVALIER
Publisher
"BUSINESS WEEK"
New York, N. Y.

BY prearrangement, Dr. Wolman* and I have divided the subject of this evening's discussion. I am going to talk about the general impact of post-war planning upon public works programs in general, while he will narrow the subject down to the water works field in which you are especially interested.

As I contemplated this subject today, I was reminded that ten years ago this week, this Association assembled in Chicago to discuss the same subject—public works as a factor in the American economy under the circumstances that then prevailed. To me it is rather an interesting fact that now, ten years later, we should be talking about the same subject. I say "interesting" because at that time, ten years ago, we had twelve to fifteen million unemployed in this country. We were trying by every desperate means within our power to raise prices and consumer income. Our great aim was to achieve "reflation," which was a polite name for inflation. We were seeking some device by which to "prime the pump," of the national economy. We wanted and craved a shot in the arm that would put this faltering economy of ours back on its feet. That was the picture ten years ago when we met to talk about the effect of public works on the national economy.

Public Works Programs

It was at that time that the American people as a whole really made their acquaintance with the public works program as a device to throw the weight of government into the economic cycle by means of deficit spending on a large scale. The effort was made at that time for two reasons, reasons that not only were different, but also were at times rather conflicting.

The first of these reasons was to create jobs in any possible way, any kind of jobs—boondoggling, work

The Author

relief, public works. It made no difference so long as we could get the unemployed on the public payroll. Those who were advocating a public works program for that reason looked upon the public works program as a relief measure. Its objective was social. Its ultimate instrument turned out to be, after a number of changes, the WPA.

Then we had another group that was very much concerned with the place of public works as a means of stabilizing or restoring the economy. The members of this group looked upon it as a device for priming the economic pump. They favored a large program of necessary and useful public works financed largely by federal borrowing that would help make up for the lack of private investment and thereby stimulate a dormant economy. These people looked upon the public works program as a device for recovery. Their objective was economic. The ultimate instrument to carry out that program was the PWA.

That was the picture ten years ago—a public works program for the purpose of creating jobs on the one hand and one for stimulating a dormant economy on the other.

Today's Pump Priming

Today, we are witnessing the greatest manpower-absorbing and pump-priming undertaking in the history of the world. If you look upon our war spending as a species of public works program, you must agree that it beggars the most fantastic aspirations of those who complained in the Thirties that our public works program was not more successful only because there wasn't enough of it. Today, we are desperately short of manpower. Today, we have to put ceilings on our wages and prices—at least, we are trying desperately to do that. Our pump is primed to overflowing, so far as public spending and deficit financing can contribute to that end.

We are trying now to siphon off, by means of taxes and enforced savings and whatnot, this surplus purchasing power that is abroad in the community. In other words, we are doped to the eyes with inflation and the economic doctors are trying to get us to quiet down and stay in bed.

This situation is exactly the opposite of what it was ten years ago, but once again we hear of the public works program—the great public works program that will be needed to meet our post-war situation. It all sounds incongruous as I present it, but I submit to you, as very practical men engaged in the administration of a vital phase of our public works activity in this country, that you must face this subject boldly and courageously at this point and that you must take a wise position with respect to it.

Responsibility of Public Works Men

I believe it is important for all of you and all of us who are concerned with public works to do this, because the term "public works" is used so freely by a great many people who would use the activity by which you make your living and serve your respective communities as a lever whereby to effect radical changes in the form of our economy and perhaps in the form of our government. And you, it seems to me, the least of all Americans, can afford to have this vital function with which you are entrusted perverted to any purpose that eventually will bring it into discredit with the American people.

A major responsibility of public works men in all branches of service, it seems to me, is to prevent confusion in the mind of Joe Doakes on Main Street between legitimate public works and the so-called pyramid building that lies behind the deficit financing theories of those who would like to make America over. This is a serious threat. If we

*A discussion presented before a special session of the American Water Works Association by Colonel Chevalier in Cleveland, Ohio, June 16, 1943.
Following Colonel Chevalier, Abel Wolman, president of A.W.W.A., discussed the matter of "Planning a Postwar Water Supply Program," which is also printed in this same issue.

do not face it, if we do not clear up this confusion, the essential and necessary public works activities of this country will suffer.

The Post-War Outlook

Now, then, in order to see the place of public works in the postwar picture, let us take a look at the post-war outlook. When we do that, we find that after this war we shall have a very large deferred demand for goods and services. The American people have been doing *without*—they have been doing without many of the things they have come to look upon as essentials of American living. Then, too, they will have a large accumulated purchasing power. The savings today are enormous. The money now in war bonds will be available. The people have wiped out a very large part of their consumer debts of one kind or another. The result is that there will be available in the hands of the American people a vast purchasing power to buy the goods that they have been denied during the war. And finally, we see an enormous "must" demand for human services the world over to rehabilitate a world that has been treated so destructively by the ravages of war.

Our paramount task, following this war, will be to bring together, and to bring together as quickly as possible, the ample manpower, the ample demand for goods and the ample purchasing power that will be available. Now I want to emphasize the expression as quickly as possible because there, it seems to me, will be the critical phase of the postwar period. I say this because in the months immediately following the war, we shall be up against such inflation dynamite as we cannot possibly know during the war.

When Fighting Stops—Inflation!

Just as soon as the fighting stops, the struggle to keep the lid on the vast accumulated funds in the hands of the people will be tougher than ever. The patriotic appeal will be worn out. We can appeal no longer to the American people to curb their desires and refrain from spending their money in order to help win the war. The war will be in the bag. We shall have a natural tendency to go out and satisfy ourselves with all the things we have been denied and, since we shall have the money to spend, it will be exceedingly difficult to put the curbs upon inflation that we now can maintain in the name of patriotism. The people will want things and they will have the money to buy them. The question is whether they will want them so badly that they will demand the abolition of all controls, crowd into the market place with their money and bid up prices until we have an inflation the like of which would beggar anything we have ever imagined.

During this period, the months immediately following the end of the fighting, we shall be in a race, a race between runaway inflation and the conversion of our industries to produce civilian goods. In my judgment, that race must be won within six months or a year, or else we shall not be able to control the inflationary forces that will be inherent in our economy at that time.

Therefore, the job of America—our industries, our people, our government—the dominant job that will confront us the minute that the fighting stops is to get ahead with the production of the kind of goods that the American people will want to buy, the kind of goods that they have been doing without. We must get in production, just as quickly as possible, to pour those goods out on the market where they can help to sop up the purchasing power that will remain in their hands.

Critical Period—Six Months to a Year

This, in my judgment, will be the critical postwar period—the first six months, the first year perhaps. I don't know whether we can survive a year without accomplishing this objective. That critical period will determine whether or not we shall have a collapse of our entire economy. It will determine whether or not the people will suffer the loss of their savings and of their faith in the future with all that that would mean to the security of your industry and with all that it would mean to the job-making capacity of American industry as a whole. If we can weather that threat, we may well have from five to ten busy years following it, years that may be reasonably prosperous despite the war burdens that we must carry. If we can get through this first six months or a year without collapse, and then have from five to ten reasonably good years we may be able to make up for all these deficiencies in an orderly manner; but if we can't make that first six to twelve months without collapse, we shall be in a bad way indeed.

This period will determine also whether we shall be able to restore American ideas and institutions or whether we shall be forced to adopt some of the very measures that we are fighting in this war. If we are unable within that period to rebuild our industries and to reconvert them to produce the volume of consumer goods that our people will have the money and the desire for, we may have to look forward to an indefinite period of regimentation, regulation and other government controls that none of us wants to face, I am sure. But they may be forced upon us by circumstances. And if we are forced into that position immediately following this war, no man is wise enough to say when we may be able to throw off those shackles and get back to the American conception of a free economy.

Very briefly stated, then, it seems to me that the major postwar problem is to swing our manpower as quickly as possible into the task of rebuilding and reconverting our productive facilities to meet the pent-up civilian demands of the people. This will be done only by creating productive jobs, jobs that will add to the actual wealth of the people. That cannot be accomplished by any form of made-work jobs, by any process of simply putting people on payrolls for putting in their time. If we are going to cope with this situation, every job that we create must be a job that will produce something useful and usable, something that the American people want and need and are willing to pay for.

There should not be any reason at all to create artificial purchasing power or to devise synthetic jobs. The situation will be exactly opposite to what it was ten years ago, when we were trying to create purchasing power and when we were trying, by any means, to create jobs.

Proper Post-War Program

A proper postwar program, then, calls for both public and private enterprise. It calls for the provision of both public facilities and private facilities. The chief function of government, however, will not be to stimulate a prostrate economy or to supplant private industry in putting our money to work. It will be, on the one hand, to get under way the large backlog of necessary public construction that will have accumulated during the war and, on the other, to create a climate in which private enterprise will be able to go all-out with the perfectly enormous productive job that it must do if we are to get our civilian economy in balance before it is too late.

Those are the two postwar jobs of government, both of them contributing to the end I have just described of creating useful and usable wealth to meet the needs of the American

people, whether it be in the form of worth-while public works or in the form of creating a climate in which private enterprise can take up the job that will be cut out for it. Nothing else can assure a maintenance of the earning power of our people and of our business concerns. And be it noted here that the earning power of our people and of our business concerns is what we shall need to pay the taxes that will be required to finance not only our essential public works, but also the heritage of debt that will be left to us by the war.

Here is not the place to discuss in detail what should be done to create that climate. That is a matter for our economists, business men and government officials to discuss, describe, define and legislate. That task is in hand in many quarters today through competent agencies. I want to turn directly to the public works phase of government activity following the war. The first principle that I would lay down is that our public works, like every other form of postwar activity, should be on the basis of utility and nothing else. To quote the National Resources Planning Board report:

"These public works must be to provide the maximum of public service for the minimum outlay of labor, materials, equipment and public funds . . . The postwar program that we undertake will be in reality the postwar version of our regular public works program rather than a special purpose program set up parallel to a program of regular activities. Such a program will insure the maximum contribution that public works can make to postwar adjustment."

Now I don't believe that it is possible for any group of men in Washington or anywhere else to draw up a rigid and detailed postwar public works budget for the country. That is a continuous job. It is a job that must be decentralized. It is a job that must be undertaken simultaneously through many agencies throughout the country, because it must be budgeted on the basis of its immediate utility to the people who will use these facilities and who in the long run must pay for them.

Some Figures on Post-War Economy

I want to cite some figures that may mean little or much, depending upon how the basic figure may be realized. A figure that is much used by those who are planning for the postwar economy is that of 135 billion dollars of national income. Now, if we should realize a national income of 135 billion dollars, we might with justice, based on past experience, allocate approximately 16½ billion of that for all forms of construction, both public and private. Of this construction program of 16½ billion, we might with propriety estimate that some 30 per cent, or 5½ billion dollars be expended for public construction. I submit to you that 5½ billion dollars for public construction represents a very substantial budget to carry on the public works of this country in the period immediately following the war. I have no expectation that that total could be achieved in the first year following the war, but it is, nevertheless, a mark to shoot at, based on the assumption of a 135-billion-dollar national income. Any attempt to swell the total beyond that figure, it seems to me, will carry us over into the phase of "pyramid building," which would have for its purpose not the provision of useful and usable public works, but rather the purpose of using public works expenditure as an instrument for effecting radical changes in the nature of our economy.

A public construction budget of 5½ billion dollars amounts to about $40 per capita. From 1915 to 1929 public works expenditures in this country increased from $9.89 to $26.55 per capita, so that these estimates based upon 135 billion dollars national income are not out of line when you consider the large deferred volume of public works and the higher standard of living that necessitates a larger amount of public investment per capita in this country.

Public Works and the Transition Period

But we must keep one point in mind as we approach the practical problem of drawing plans for such a program. We should not expect to swing too much of our resources into public works during the immediate transition period following the war, since, as I have indicated, our chief task then will be to reconvert our industries—including, incidentally, the industries that will be required to serve the water works program of the country as it gets under way—into production on civilian goods to match our high purchasing power. That will be our one paramount job for the period immediately following the war. Any excessive public works program at that time would but add to the inflationary danger by increasing the amount of money in the hands of the people without a commensurate increase in the volume of consumer goods that would be manufactured and offered to them for sale. Everything that we do in that way to increase the amount of money flowing out into the hands of the people without a commensurate increase in the volume of consumer goods produced will simply enhance the danger of an inflation that already is menacing.

Timing, therefore, is a matter of the first importance in planning our postwar public works program. I assume, of course, that just as quickly as possible the deferred essential services must be put promptly in hand. I refer to the deferred construction of water works, sewerage, pavements, the reconstruction of highways and all the rest that is now neglected in the interest of the war effort. That is an immediate task to be undertaken just as soon as we are able to divert our energies from war to peace. That should come first.

New Forms of Public Facilities

I recognize also the need for a great many new forms of public facilities. The expansion of civilian aviation, for example, will bring about a new need for airport development. The contemplated large program of new home construction submits a demand for public facilities to serve it; the elimination of slum areas on a large scale, which well may be undertaken in the postwar period once again creates such a demand. There will be ample demand for public facilities in the period immediately following the war—urgently necessary demands—so I do not see that it will be necessary for us to whip up artificially any great program of public works construction.

We must remember always that whatever industrial expansion is contemplated by private enterprise in order to realize higher living standards for the American people always has its counterpart in the expansion of the public facilities required to service that expansion. We can't have an expansion of private industry in this country without at the same time having an expansion of the public facilities that are necessary to service that industry and the people employed by it.

Too often public facilities and private facilities are considered to be competitive. Too often we are submitted a choice between private facilities and public facilities. They are not competitive. They are, and should be considered as, supplementary. I know of no fixed numerical ratio between public and private expansion of facilities, but I do know that they move always in a parallel and that they are inter-dependent. That will

be especially true during a period when both public and private enterprise have been starved by the exigencies of the war and when both of them, of necessity, have deferred their activities until we could turn back to them at the end of the war.

If we regard public works in this light, as essential service facilities geared to the rest of our economic activity, we shall not go wrong in making our plans for postwar public works. For public works, soundly conceived, soundly built, soundly administered, are an essential element of the physical plant that constitutes the capital of the American people—the physical plant that provides a physical basis for the human welfare of the people as well as for their agricultural and industrial activities.

One more point: Most public works are carried on by municipalities rather than by the states or by the federal government. Whatever collaboration we may get from the federal government in guidance, in engineering help, in financing, the bulk of our public works—and this is not understood by many of the people who toss public works programs around so recklessly—the bulk of public works is local. It is municipal, it consists of projects that serve our cities and our towns and our villages.

Decentralize Post-War Public Works Planning

Postwar planning, therefore, as I suggested a few minutes ago, should be decentralized. I mean, of course, postwar planning for public works. No central agency can draw up a master blueprint to provide for the vast variety of services that are covered by the American public works program in total. Now is a good time for us to do this planning, for us to do the planning locally. And here I would suggest to you who are so vitally concerned, whose personal futures and whose professional careers are bound up with this problem of public works planning, construction and administration, that now is an awfully good time to get the business element in your community on your side. The business men in every community should be taking a constructive interest in the public affairs of their community. They should be doing it as a matter of self-preservation, as a matter of self-interest.

There is no question but that after this war the government—federal, state and local—will have a much greater part in the lives of the American people and in their business affairs than it ever had before. And the business man is awakening to the fact. He is beginning to realize that he is of the community, that he is not apart from it, that the community isn't on one side of a wall and he on the other, that what the community does is bound to have a terrific impact upon his own welfare and that what he does is bound to have a just as terrific an impact upon the welfare of the community. If we can interest the business men and industrialists of our communities today in sound, useful public works, we shall be able to help them see the whole matter in a new light. We can help them to see, for example, that the American standard of living is not merely a matter of gadgets, that it involves services as well as gadgets and that many of these services are matters of community concern.

The American standard of living is vitally dependent, for example, upon our sanitary sewage disposal, our public recreation facilities, our general education, a reasonable conservation of public health, ample and safe water supplies. These are provided, all of them—these essentials to the American standard of living—through a variety of public agencies whose fixed facilities we call by the name "public works." And these public works are just as vital to the American standard of living as are the factories that turn out our automobiles, washing machines, vacuum cleaners and motion pictures. We have a chance today to convince the American business men and industrialists of that as they never have been convinced before.

And there is another job that we can do. We can convince the business man or the industrialist that there are certain types of public works that are essential to him, not merely as one citizen of the community but as a business man—facilities that are essential, if you please, to the conduct of many forms of private enterprise. Let me cite but a couple of examples. Our highways are the foundation upon which the entire automotive industry is built and I don't mean just the manufacture of cars, the production of gasoline or the manufacture of tires. I am thinking of insurance. I am thinking of tourist camps. I am thinking of the hotel business. I am thinking of the filling-stations, the garages, yes, even the humble hot-dog stands. Many forms of private enterprise in the United States have no existence except for the public investment in our highways that makes them all possible.

Then there is flood control, irrigation, soil and forest conservation, all of which make a direct contribution to the creation of agricultural wealth and to the maintenance of an agricultural economy built upon private enterprise.

Public Works NOT Synonymous with Deficit Spending

These are all examples of what public works mean to the business man, to the industrialist and to the citizen. But, unfortunately, too many of our business men have been led to look upon this term "public works" as somehow tied up with the conception of a collectivist, a managed economy. Somehow or other, public works are synonymous to him with deficit spending by government. Somehow, he thinks of public works as an agency through which those who could change the form of our economy are planning to work. And that is unfortunate.

Those of you who are in charge of the public works in your communities, it seems to me should use this opportunity to get more closely in touch with those who hold these mistaken views and to bring them around. You can help them to see that there is no essential difference between the public facility that is built upon the same basis of creating wealth, of creating value for the people of the community, and the private enterprise that is designed to produce and sell some commodity that the people want and use. It is our chance today to win their understanding and support for legitimate public works and to show them that adequate public works are essential to their own interest and well-being as business men as well as citizens. And I say to you that business men today are more conscious of social and community values than they ever were before.

Thus, I close on the note that the place of public works in the postwar program is not the same place that we were staking out for it ten years ago. Then, we were in a fainting economy. Then we needed an economic shot in the arm. Today we are in an economy overstimulated and overinflated. It is not necessary to sell public works on any such basis today.

You will be smart in your own interest and in the interests of the people you serve in your several communities if you hew to the line in presenting your public works programs based upon logic, reason, need and economic justification. I am sure that if you do that, you can get the support of the business and industrial interests for every reasonable need of the communities that you are trying to serve.

PLANNING THE POST-WAR WATER SUPPLY PROGRAM*

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COLONEL Chevalier has carefully prepared for you the ground with respect to public works in our national economy. I was glad to have him outline for you the first principles which I think any sane, any logical, any competent citizen of this country would be likely to accept.

He has properly pointed out to you that we should strip this particular field of a number of the bogeymen that have been accummulated over a period of ten strenuous years. I am not so sure that I need prolong that introductory phase for you except to say that it would be a welcome step forward if we were to add to the series of objectionable features in public works planning which should be forgotten very promptly. I refer even to nomenclature, in the descriptions of individuals who are interested in planning with respect to postwar periods.

It was entirely conscious on my part that early this week I got a haircut preparatory to avoid being accused of being a long-haired utopian planner. Part of that responsibility is really Mrs. Wolman's because she doesn't like the way I look with too long hair; but part of it was a subconscious attempt to get out of the classification of utopian, long-haired academicians, into which group one is placed the minute he starts thinking about what may come next year or the year after.

Secondly, I certainly want to be eliminated from the class of defeatists—those people who are not anxious or are certainly unwilling to think ahead in postwar terms. One recent author has described that group as "the people who refuse to cross their bridges until they have been burned behind them."

I do not share that particular view. I like, if possible, to feel that you may classify me at the end of these remarks in what we call the "realistic group." The realists are those who are unwilling to see too far ahead, are afraid to be left by the bandwagon and manage to climb on half-way down the road when it is fairly clear where the bus is going.

Dr. Abel Wolman

In a way, that is a reasonable picture of a realist and it is his reasonable position which I want to present to you, largely with specific reference to the limited and simple field of public water supply facilities. I think of this position as far less complicated, far more familiar and far less difficult to conceive of or to plan for than is generally supposed.

Colonel Chevalier has described several possibilities of the postwar period. I am not enough of an economist, certainly not enough of a prophet, to determine whether he is right or wrong. He has safeguarded himself through his long experience by telling you he did not know whether he was right or wrong. There will, however, be—and he and I agree fundamentally on this—a postwar period in the United States. Failing some geological cataclysm, we are assured of that one assumption; and it is a rather basic assumption, simple as it sounds, that there will be a postwar period.

It may be one of high prosperity. It may be one of great inflationary difficulty. It may be one of short-term transitional difficulty, but we will be here, or at least some of our associates will be here who are hardier than the Colonel and I.

Therefore, there is every excuse, and we seem to need one, for talking about that postwar period, even though it may be overdignified by calling it long-range planning, even though it may be overdignified by insisting that we must make over the world within that next ten-year period—say, of 1944 to 1954.

It is quite immaterial to the purposes of my thesis as to whether we think of it on the long-range basis or on a short-range one. The point I want to make with reference to it is that we should insist upon a perfectly orthodox thinking ahead.

I find it curious to have to combat the desire to avoid postwar planning in many sections, because thinking ahead has always seemed to me to be an orthodox process. If I recall, it dates back over 150 years. It has only come under disrepute, apparently, in recent years. If you want to look ahead more than twenty minutes, it is now considered to be either New Dealism or a prelude to collectivism. I do not really think it means that.

Wisdom of Looking Ahead

It means we have to resume a balance in our point of view, we have to regain our equilibrium and insist that it is good business, it is wise public policy, it is desirable public policy to look ahead. That is peculiarly true in the water works field, where we have often been chided by city councils, by mayors, by county commissioners for looking ahead too far, looking ahead perhaps even as long as ten years, which is, of course, an awfully long time to a city council which only looks ahead to the next election.

But, as water works people, we have always looked ahead in terms of ten, twenty and thirty years. Now, when we do that, we introduce a concept of the desirability of what I call a "ten-year thinking." And ten-year thinking, again in the water works field, is a simple concept with which we have all been associated in the past.

When we do that, what are we confronted with in the specific field of water production, treatment and

*A discussion presented by Dr. Wolman before a Special Session on "The Relation of Public Water Supply to the Postwar Program" on June 16th at the Cleveland Conference of A.W.W.A.

A discussion presented by Colonel Chevalier on "The Impact of Postwar Planning on Public Works Programs" in this same Special Session is also printed in this issue.

distribution? That is our first necessity—the determination of need in the postwar period.

Regardless of how long it is, regardless of economic situations, regardless of which ever party, Republican or Democratic or whatnot is in force, because I have the faint idea that regardless of who or what runs the country, after the war there will be, again, not only a postwar period but postwar public works and there will be a public water supply. It is one of the peculiarities of our profession that we furnish something without which even a Republican or a Democrat cannot do. It sometimes seems a calamity but it really is always good fortune that water supply is a necessary service and one which, incidentally, does not recognize political boundaries or political complexions or political distribution.

When we try to estimate that postwar need, one way of doing it, of course, is by reviewing the past. The past is a prelude to the future; and it gives us a cue as to what we have been accustomed to doing in that field. I hesitate to use statistics in an audience which is as mixed as this. I know the men abhor statistics and the women love them, but in instances of this sort it is necessary to introduce a few figures. They are sufficiently large, with a sufficiently large number of zeros, so that they need not disconcert you.

In the period from 1920 to 1930 in the water supply field we spent on the average about 130 million dollars a year. That is a figure to bear in mind as a base from which we step off. It was quite independent of any other situations. It was a current keeping up of our normal municipal housekeeping. It was desirable for servicing consumers, for industries, fire protection and so on, and it averaged about 130 million dollars a year.

You may recall that at one time during that period we had a platinum age. It did not last long, but in that flush year of 1930 we spent 200 million dollars in the water supply field. Some of us may regret that we were quite that exuberant, but we did it, and we did it for reasons which appeared to be good at that time.

At present we furnish public water supply in this country to about 75 million people. We estimate that, during the next ten-year period, we will have, in addition to the increment of some four to nine million people that have come into the metropolitan areas in the last ten years and who are now unserved by public water supply, an additional population growth of a normal character. It may be slow. It may be disappointing to some. It may be the result of a variety of other checks and balances, but the curve is still upward and is likely to remain so over the next ten-year period.

Estimated Needs in Water Supply During the Decade Ahead

Thus, on the basis of those three or four fundamental facts—what we spent before, what we have had in increased population up to the present date, what we are likely to experience over the next ten years—we have three sets of cues by which we may determine what our needs will be from, say, 1945 to 1955.

Now what do they appear to be? Our present population increase indicates that as soon as the war is over about 20 million dollars a year of expenditures will be required to catch up with new people, people who at the moment need water supply but cannot be supplied with that necessary service.

We will have, secondly, what we call current replacements, because of our delayed maintenance, because of our lack of opportunity to get materials and equipment, of about 72 million dollars a year. It is the lag in our previous accumulated deficiencies. We have also a series of new deficiencies which will start or which have started and will accompany us on this highway during the next ten years and which will amount to 18 million dollars a year for new population growth and for the service which they should receive.

We have a good deal of substandard equipment in the field in operation today only because we do not find it possible to replace it. We estimate that that will require in the neighborhood of 59 million dollars a year for the next ten years. Many of us believe that there will be a great deal of new housing during the next ten years. It is variously estimated, depending upon the enthusiasm of the individual, his experience, his hopes, his courage, perhaps even his political complexion, but, regardless of these factors, all seem to feel that somewhere between ½ to 1½ million new houses will be necessary annually during the next ten-year period, which, in turn, will require about 50 million dollars a year in water works expenditures.

These Add Up to Better Than $200,000,000 per Year

Those of you who have been carefully jotting down these figures can accompany me while I add them up. They represent approximately 218 to 220 million dollars a year for the next ten-year period. It does not sound out of reason in comparison with the average in the previous decade, 1920 to 1930, of 130 million dollars a year. It is not outlandish, as I say; it is within the realm of possibility and even if it falls below or above that figure by several million dollars, it is not of any great importance in relation to our topic.

Now what about it? The things that should be of interest to the water works people are not so much that we will be confronted, in round numbers, with something approaching a quarter of a billion dollars a year in water works expenditures, but what we ought to do about it at this particular time. I do not mean tonight, because we intend to give you a waiting period until tomorrow morning before you start preparing for this enterprise, but it is important to consider what ought to be done in the interval between now and the end of war, which we all hope will be a shorter period than we anticipated a year ago.

Some Things to Do in the Look Ahead

Here again, there is a series of simple things to do. They are orthodox. They are not peculiar to any special regime. They are sound from an engineering standpoint, sound from a public standpoint. I list only four or five of them, not necessarily in the order of their importance.

They are, first, as Colonel Chevalier has properly pointed out, the analysis of your local requirements and needs. I want to add a word regarding that local appraisal of what you will require in the water works field over the next ten years. It is an appraisal that must be made locally. It is not purely a literary cliché to talk about *local responsibility*. It is a fact. The local people are the people who ought to know.

I have only one criticism when we talk about it. It is a criticism I have voiced for as long as ten years, since the last public works program. Talking about local responsibility is a different thing from practicing it—and that should sink in with most of the local representatives here today. You cannot talk "local responsibility" and sit around waiting for a telegram from Washington that you have been awarded a million dollars to start work. That

is not my definition of local responsibility, either for appraisal or for beginning the number two job that I have listed here. And I want to emphasize it for this reason: Many of you think that it is an unfair charge, but I could list, if I had the time and the stenographers and the adding machines, approximately 13,000 municipal officials out of 13,500 in the water supply field who are doing this very minute just what I have described. They are waiting for the passage of some kind of an act—HR60476 or Senate Bill 34579—that will do what? It will permit you to continue to talk about local responsibility and to spend federal money.

It is the most comfortable position I know that you can be in, at least temporarily, because it is only temporary. I make the charge, and I hope the Colonel will forgive me for making it. I am quite sure he will, because this is the time when local municipalities, counties, states, should be using some of the money which they now have to do some of this appraisal without taking the first train to Washington to see whether somebody there is going to see to it that they get the money. In other words, some are fed up on the conversation about local responsibility unaccompanied by action in "local responsibility." And it is a lesson I should like to leave with this group, so that when they go home they can look into their own reserves, into their own accumulated incomes, to see whether it really is not possible—rather than outlandish or fantastic—that they might employ a competent group of consulting engineers to make the appraisal for them before they discover whether or not a remote Santa Claus in Washington is going to do it for them.

What Will Congress Do?
What of Inflation?
What of Local Responsibility?

There are several bills in Congress today—most of you are following them with great care, because you should not miss any tricks—that will do just what you are waiting for, but why do you wait? If you really believe in what Colonel Chevalier described as local responsibility, why don't you demonstrate that you have, in addition to local autonomy, local responsibility; because, again, as I pointed out before, every dollar that you get from Washington first of all is your own. Remember that. Secondly, it carries a certain irritating responsibility with it which you do not like. But you must remember that, unless it is distributed on the street corner, sight unseen, it must carry certain strings attached to it. If all the municipalities in the United States were poverty stricken, I could sympathize with them, but I do not believe they are.

When we talk about inflation possibilities we cover both private and public money. Every municipality, every county and every state in the Union that today reduces its tax rates in order to have more money flow into public buying, in order to avoid the establishment of reserves for postwar use, adds just that bit to the severance of "local responsibility" and to the creation of central control.

The second item in my program is the authorization of the project. That, too, is leisurely waiting around to see what Washington is going to do—waiting to see what that distant angel or devil, depending on how you want to describe it and on whether the check arrives on time or whether it arrives with a restriction—is going to do.

Again I say, why wait? Why not determine what your needs are authoritatively and go forward with them? Authorize your project.

Thirdly, prepare your detailed plans and specifications. The opposition to that, that I find throughout the country, is very interesting. Whether it is a rationalization or not, I do not know. When you say prepare plans and specifications for new water supply, one of the answers is: "Well, don't do that now because there is going to be such a marvelous and mysterious after-war set of new products. Instead of cast-iron pipe we are going to have *papier maché* or something else, instead of a pump we are going to be able to look at the water and it will climb 150 feet to where we want it. We will be using electronics . . ." That fear, or rather that hope, for the mysterious is another retardant.

I think it is reasonable to say that it will be a marvelous world. There will be many of the war developments in technology translated into peacetime water supply use. But here again, we may prophesy with a little bit more courage and a little bit more assurance. It is not likely to revolutionize the distribution system of the average municipality. It is not likely to revolutionize the pumping system. It will do some things in the treatment processes, but they are not likely to be of such heroic nature that the mere studies of their desirability and need should be avoided.

The same thing is being said about houses. I do not know what kind of house we are going to live in in 1945 or 1946 or 1948 but, in talking to some people who want to avoid thinking ahead, I have heard it said that you should not design or think or touch that kind of a field because some kind of a miraculous house, without walls, without heat without kitchens, without food, will be available after the war, in which all you will have to do is carry around a small box. Even assuming that vast improvements in the housing field will take place, I suspect that you will be able to recognize a house as we have designed it in 1943 when we pass it in 1947. I merely suspect that. It may look odd to us, but we will know what it is. Of course, that is no great improvement over the kind of houses we have been distinguished for in Baltimore for many years, where you never knew where your house was in a block. The house couldn't be any more mysterious than our row house in Baltimore always was—where every house looked like the next door one and you frequently went into the wrong house or the right house—but there will, again, be something for which you must supply a water service.

Fourth, we certainly should consider the question of providing, in the next ten years, for the appropriation of funds. That does not mean that the mayor and the city council will sit down and say: "We think you have sold us. You have sold us on the idea, and, therefore, we should have some money." It means more than that, as every water works man knows. It means going through the various steps of legislative procedure, of authorization, even of a referendum. Certainly some of those steps should be taken in the immediate future, so we do not experience what we did in 1933—a lag of nine to eighteen months before there was a pick in the ground or a steam-shovel at work on projects that were said to be ready to go. We have the same set of propects today, not exactly the same set, because we have built some, but we have lists flowing into Washington which are remarkable not only for their size, and I can tell you they are remarkable for that, but regardless of their size, they are remarkable by their presumed readiness to go, which, frankly, is the bunk. They are not ready to go. They are merely lists on a piece of paper. They are descriptions of a hope. They are not construction drawings or specifications.

They carry no land, no right-of-way, no authorizations, no legislative requirements already met.

I want to emphasize, too, that every mayor who submits a list of his postwar projects to the newspaper—and I have seen many of them, aggregating 90 to 100 million dollars—is fooling his public. Those projects are non-existent, except, as I say, in the hope that you may some day build them. They are not the kind of thing we are talking about tonight.

In addition to having a major problem of preparation in the physical field, where do we get the money? Locally or centrally? Are we prepared by legislative authority to get it? Are we prepared in our taxation scheme to provide a way for paying for it? Most of us are not. There are a few public enterprises in this country and in Canada that, during the last year, have set up legal authority and are setting aside money reserves for the very purpose we are talking about. In our own state within the past two months a legislative act has been passed authorizing every community in the state to establish postwar reserves today, to set aside parts of their income so they are not completely free of money at a later time. The federal government has introduced several acts, none of which has passed at the moment, which provide the same thing for public enterprise and—some of us hope—for private enterprise, setting the stage, as it were, for the fiscal aspects of your enterprise.

The Administrative and Political Question in Future Water Supply Planning

Lastly, I want to refer to the very complicated administrative and political decisions and arrangements that we have to make, likewise for the next ten years. Here I get into a very difficult problem of American political subdivision. I have referred to it before at some of these meetings; I stress it again. The water works man and the general public works man is in general bound by political subdivison boundaries. He is bound by a map on which there is a black line that says: "This is the boundary of St. Louis," or "of Kansas City," or "of Baltimore," or "of Philadelphia" or "of Detroit." Actually his community has disappeared from within the bounds of that line. It has been confined only on the map. It has spread by virtue of a thousand reasons into a territory which he frowns upon. He frowns upon it in a dozen ways—by his restrictions toward extensions, by his control of what goes on inside as distinct from outside. He is bound, as I say, by a political boundary line of 1800 and his water supply service operates on the basis of resisting the growth of the metropolitan area or the growth of the region. We require, therefore, in parallel with these things of which I have spoken, an adjustment in political boundary thinking, a reorientation so that our boundary of service of water will begin to parallel the boundary of metropolitan and regional living, because it has escaped from the boundary of the city. A kind of geographical surgery is required during the next ten years. The term I borrowed from Lord Bryce. Curiously enough, he referred, in his visit to this country many, many decades ago, to the necessity of geographical surgery in order to meet the requirements of man. What I am suggesting is a kind of geographical plastic surgery. By that I mean adding to our municipal boundary lines a kind of metropolitan form that will be less amorphous than it is today, better designed and more really approaching a kind of living entity. The kind of geographical surgery that Lord Bryce referred to many years ago should accompany our planning in the water supply field.

A Joint Committee on Post-War Water Supply Problems

Although I may not have exhausted the subject, I certainly have exhausted you, but I want to refer to one more item. Within the past few months this whole problem has been given serious consideration by three of your national organizations—the New England Water Works Association, the Federation of Sewage Works Associations and the American Water Works Association. These organizations hope to join interests in some central group which will make it its function during the next two to three years, to develop on an educational basis the ideas which both Colonel Chevalier and I have tried to present to you—in other words, to introduce throughout the country as skillfully, as reasonably and as accurately as it can, what these necessities are, how the problem can be approached locally, what you should do to recover, not local autonomy, but local responsibility, how you can best use the professional brains and services which you have and how you can carry your public with you so they can accompany you along a road, not to a millennium, but to a reasonable American way of life.

The Manufacturers Elect

During the A. W. W. A. Conference in Cleveland, at which 397 manufacturers' representatives were officially registered, the Water and Sewage Works Mfrs. Assn. held its annual meeting and chose the following officers for the next fiscal year, beginning November 1, 1943.

President

Chas. A. McGinnis, Mgr., Transite Division, Johns Manville Co., New York, N. Y.

Vice-President

Chas. A. Becker, General Sales Manager, R. D. Wood Co., Philadelphia, Pa.

Treasurer

Edgar J. Buttenheim, President, "The American City Magazine," New York, N. Y.

As the association's representative on the A. W. W. A. Board of Directors for a three-year term, Chas. A. McGinnis was elected to succeed Dennis O'Brien, whose term as director expired this year.

To represent the Manufacturers' Association on the important General Policy Committee of A. W. W. A., Wm. J. Orchard was chosen to succeed John A. Kienle, retired.

To the Governing Board

The following firms were elected for three-year terms:

The Dorr Co.
Hersey Meter Mfg. Co.
Lock-Joint Pipe Co.
National Water Main Cleaning Co.
Pittsburgh-Equitable Meter Co.

To the Executive Committee of the Water Division

The following were elected for three-year terms:

W. Va. Pulp and Paper Co.
(Ind. Chemical Sales Div.)
"Public Works" Magazine.
Wallace and Tiernan Co.

To the Executive Committee of the Sewage Division

The following were elected for three-year terms:

American Well Works, Inc.
Pacific Flush-Tank Co.
Wailes-Dove-Hermiston Co.

EXPERIENCES WITH MANGANESE REMOVAL AT DURHAM, N. C.

By ROBERT S. PHILLIPS
Chief Chemist, Water Department
DURHAM, N. C.

THE City of Durham receives its raw water from Lake Michie on Flat River, approximately nine miles from the city. This lake will impound almost five billion gallons of water, a sufficient amount to provide the city with water even during a period of prolonged drought.

The raw water is pumped to a storage reservoir at the treatment plant through 24″ and 20″ mains. The storage reservoir is of sufficient capacity to hold nearly a week's supply at peak demand.

Occurrence of Manganese

The source of manganese in the Durham supply seems to be the manganese-bearing rock and clay forming the bed of the impounding lake. Long periods of impounding, due to lack of rainfall, and proper conditions for anaerobic decomposition causes relatively large amounts of manganese to be released to the raw water, the quantities being revealed in Table I.

The tabulated data reveals the occurrence of manganese may reach a maximum at any time from midsummer to late fall. Also, unless the rainfall is not considerably above normal the manganese content may become quite serious. This is especially true when the rainfall in two consecutive years like 1940 and 1941 is far below normal. Even with normal rainfall (annual) the manganese content may reach high levels, as in 1938 when the last six months of the year were relatively dry.

The Author

Table I

Year	Percentage Normal Rainfall (Annual)	Manganese in Impounded Water (ppm) Avg.	Max.	Month of Maximum Occurrence
1935	84	0.05	0.23	August
1936	121	0.04	0.19	September
1937	115	0.03	0.07	October
1938	98	0.10	1.20	September
1939	117	0.05	0.18	November
1940	86	0.10	0.75	August
1941	54	0.27	1.40	August and October

Removal of Manganese by the Permanganate Oxidation Method

Since 1933 we have been removing manganese by the use of the Permanganate Oxidation Method. This method over the entire period of years has accomplished the desired results producing an effluent water low in manganese. For purposes of comparison later in this article the results of this treatment are given for August 1941 in Table II.

Table II
Permanganate Oxidation Method
(August 1941)

	Parts per million Max.	Min.	Avg.
Raw Water, Manganese, (Mn)	1.20	0.60	0.82
Filtered Water, Manganese, (Mn)	0.12	0.03	0.07
Dosage, Potassium Permanganate	2.22	1.73	1.95

It will be noted that the required

Interior of Durham's Filter Plant

dosage of $KMnO_4$ was slightly more than twice the manganese content of the raw water. This ratio is typical of our experience for the past eight years when the method was used.

Early in 1941 it became evident that Potassium Permanganate crystals would not be available for use in quantities required for water treatment. This chemical, therefore, became for us the first casualty of World War II and it was necessary to seek another method of removing manganese.

Methods Put to Laboratory Test

Experimental work was immediately begun in an attempt to find a satisfactory substitute for the Permanganate Method.

As pointed out, we have a relatively large raw water storage reservoir at the treatment plant with a retention period of a week or more. An experiment was set up to determine the time required to oxidize the manganese under the influence of a relatively high pH, and to find out if the oxidized manganese could then be removed with ordinary alum flocculation.

Each of seven large bottles of lake water was dosed with hydrated lime (23 ppm) to an initial pH of 9.3, and allowed to stand at room temperature. Each day a portion of the settled water was carefully siphoned off from one bottle. A manganese determination was made on the siphoned-off sample before treatment. Another portion of the settled sample was coagulated with 40 ppm Alum. The jar was then allowed to settle three hours, after which the supernatant was filtered (No. 12 Filter Paper used, discarding the first 200 mls. filtrate) and another manganese determination made on the filtrate. The following results were obtained:

Table III
Laboratory Results Manganese Oxidation with Hydrated Lime

Contact Time with $Ca(OH)_2$, days	0	1	2	3	4	5	6	7
pH	9.3	9.1	9.1	8.9	8.9	8.7	8.6	8.5
Turbidity, Settled Water, ppm.	60	40	35	35	35	30	30	25
Manganese, Settled Water, ppm.	0.90	0.90	0.60	0.70	0.60	0.60	0.45	0.50
Manganese, Coag. and Fltd., ppm.	0.60	0.25	0.15	0.18	0.12	0.08	0.06	0.04

Although good results were indicated by the use of the lime-alum method, it would have necessitated major changes in our lime feeding and somewhat higher alum dosages would have been required. In addition it was indicated that approximately 50% of the oxidized manganese would precipitate in the raw water storage reservoir, for which an adequate removal system is not provided.

Laboratory samples of raw water coagulated with Ferric Sulfate, $Fe_2(SO4)_3$, had previously shown that approximately the same dosage of this chemical was required as with alum for efficient coagulation. The soluble iron in filtered samples was quite low (.05–.07 ppm). Hopkins (1), Black (2) and Willcomb (3) report the successful removal of manganese using iron salts and lime providing the pH of coagulation is kept above 9.0.

The series of jar tests using the commercial ferric sulfate "Ferrisul" and lime were set up. The dosage of the iron salt was kept constant while the lime added was varied. Each sample was allowed to mix and settle for the same periods as would be the case under plant conditions. After settling, the water was filtered and the manganese content determined.

This same test was duplicated many times and indicated that highly satisfactory removals could be expected with ferric sulfate and lime providing the pH of coagulation was kept sufficiently high. This confirmed the work of others.

The mechanism of removal of manganese by this method is apparently complicated and not very well understood. It appears to involve both chemical and physical actions. Willcomb (3) suggests that the action takes place in two ways: first, due to the alkali present the oxidation is rapid and the oxidation products are absorbed by the ferric hydrate floc, and secondly that the manganous hydroxide itself absorbs colloidal manganese particles. The largest absorption apparently is accomplished by the ferric flocs due to the fact that they predominate.

Earlier experiences at Albany and Providence had also demonstrated that ferric sulfate could be successfully and simply used as a coagulant for moderately colored soft waters containing manganese. We therefore made arrangements to employ ferric iron coagulation in Durham.

Table IV
Results Jar Test
Manganese Removal with Ferric Sulfate and Lime

Raw Water Data

Turbidity	30 ppm.	Free Carbon Dioxide	8 ppm.
pH	6.7	Dissolved Oxygen	4.6 ppm.
Alkalinity	24 ppm.	Manganese (Mn)	0.7 ppm.

Chemical Dosages, ppm.

Jar No.	$Fe_2(SO_4)_3$	$Ca(OH)_2$*	pH	Manganese in Filtrate, ppm.
1	25	15	7.0	0.70
2	25	20	8.2	0.70
3	25	25	8.9	0.12
4	25	30	9.2	0.04

*Note—Lime added just after floc began to form.

Table V
Summary of Results with the Use of Ferric Sulfate 1941-1942, Durham, N. C.

	1941 Sept.	Oct.	Nov.	Dec.	1942 Jan.	Feb.	July	Aug.
CHEMICAL DOSAGES (ppm.)								
$Fe_2(SO_4)_3$	27.1	24.2	25.0	24.0	19.7	19.4	39.8	28.2
$Ca(OH)_2$ (Primary)	27.7	26.9	24.2	22.3	6.9	0	35.9	33.1
Primary Chlorine	0.90	0.83	0.61	0.52	0.62	0.72	0.83	0.95
Ammonia	0.16	0.16	0.12	0.11	0.14	0.16	0.21	0.20
Carbon	2.0	3.2	3.7	3.9	4.8	2.5	2.8	3.9
RAW WATER (Averages)								
Temperature, °C.	21.5	20.1	14.5	9.2	6.0	5.9	20.2	24.1
Turbidity, ppm.	24	16	14	15	12	12	157	173
Hardness as $CaCO_3$, ppm.	20	20	20	21	20	21	14	15
Total Alkalinity, ppm.	25	27	24	24	24	23	15	15
Free Carbon Dioxide, ppm.	6.3	4.7	4.5	4.4	3.1	3.4	7.6	6.9
pH	6.9	6.9	7.0	7.1	7.2	7.2	6.6	6.7
Manganese (Mn), ppm.	0.70	0.68	0.31	0.16	0.09	0.11	0.71	0.53
Iron (Fe), ppm.	2.5	1.3	1.2	1.3	1.1	0.9	7.4	9.1
pH of Coagulation	9.0	9.1	8.9	8.8	7.1	6.1	9.1	8.9
TREATED WATER (Averages)								
Temperature, °C.	22.7	20.4	14.4	9.3	6.2	5.8	23.3	24.4
Turbidity, ppm.	0.10	0.10	0.11	0.08	0.09	0.07	0.26	0.37
Hardness as $CaCO_3$ ppm.	48	47	43	41	37	37	49	49
Total Alkalinity, ppm.	37	40	33	31	28	27	27	26
Phenolpthalein Alk., ppm.	5	10	7	3	3	4	5	4
pH	8.9	9.1	9.1	8.7	8.5	8.6	9.0	8.7
Manganese (Mn), ppm.	0.03	0.04	0.02	0.01	0.05	0.07	0.03	0.02
Iron (Fe), ppm.	0.08	0.05	0.04	0.04	0.04	0.04	0.09	0.10

"Ferrisul" Coagulation Adopted

The commercial product used was Monsanto's "Ferrisul." This chemical is of uniform granular size feeding well in ordinary dry chemical feeders. It comes in multi-walled paper bags of 100 lbs. which can be handled readily and stored without caking. A 15 gallon crock is used as a dissolving pot, into which the ferric sulfate is fed. The crock receives a constant measured flow of water through a "Rotameter,"

simple and inexpensive device for measuring low flows. The water and chemical are agitated vigorously with a mechanical agitator to insure more rapid and complete solution. The solution of ferric salt is picked up by a glass eductor and forced through an ordinary ¾" garden hose to the mixing chamber. The entire cost of equipping one dry feeder to feed this chemical was approximately $150.00. Very little trouble is experienced in dissolving the ferric salt and corrosion difficulties have been at a minimum.

The lime is applied to the water *after* approximately two minutes of mixing, at which point the iron floc has already started to form. After a further mix of about six minutes the water enters the settling basins.

The use of ferric sulfate was begun September 11, 1941 and continued until February 17, 1942. Again on June 28, 1942 it was employed and has continued in use to the present time. The results of these periods are summarized in Table V.

Comparing the Permanganate and Iron Methods

Comparative data on the two methods which have been used locally for manganese removal are interesting. The Permanganate Oxidation method is more costly and on the whole will not remove the manganese quite as completely as the iron treatment has. On the other hand with the ferric sulfate and lime method the hardness is higher in the finished water, due to high lime dosages required. And, at times the water must be coagulated above the Calcium Carbonate equilibrium point. Under this condition manganese removal is more complete and consistent.

In order to give a fairly true evaluation to the relative cost of the two methods the months of August, September and October 1940 and 1941 were selected. Throughout this period both methods were used and conditions were comparable.

Table VI
Comparison of Chemical Costs of Permanganate Oxidation Method and Ferric Sulfate Method

	$KMnO_4$ Method	$Fe_2(SO_4)_3$ Method
M.G. Treated	274.121	339.779
Alum, lbs.	58,200	0
Ferric Sulfate, lbs.	0	67,600
Lime, lbs.	40,200	73,950
Permanganate, lbs.	3,850	0
Chlorine, lbs.	2,508	1,908
Ammonia, lbs.	353	398
Total Cost Chemicals	$1,993.01	$1,617.19
Cost per M.G.	$7.27	$4.76

The Matter of pH Valves

Experience throughout 1941 and 1942 in periods of manganese removal with ferric sulfate has indicated that it is not always necessary to carry the pH of coagulation above 9.0. Satisfactory manganese removals (less than .05 ppm in filter effluent) have been obtained with the pH as low as 8.5. Rather the pH of coagulation necessary for good manganese removals will vary between 8.5 and 9.3 depending on the concentration of manganese in the raw water. The higher the manganese content in the untreated water the higher the pH of coagulation must be carried to achieve satisfactory results. This is important where industrial users require a finished water in which the calcium hardness must be kept at a minimum.

Table VII
Showing the Lowest pH of Coagulation to Reduce Manganese Content in Filter Effluent to .05 ppm. or Less with Various Concentrations of Manganese in Untreated Water.

pH of Coagulation	Manganese in Untreated Water ppm.
8.5	0.20
8.6	0.30
8.7	0.40
8.8	0.55
8.9	0.65
9.0	0.75
9.1	1.00
9.2	1.20

In manganese removal the Ferric Sulfate Method works very well providing the soft water treated is only moderately colored. This was true in our case during 1941. During the current season, however, the raw water contained a relatively high color—200 to 300 ppm—in addition to high concentrations of manganese and turbidity. When the water was coagulated at a high pH for manganese removal the color of the filter effluent was 15–20 ppm. When the pH of coagulation was lowered to the acid range all of the color was removed but the manganese content remained unaffected. The choice was clear; we chose to allow the lesser of the two evils to remain in the finished water. We, therefore, delivered a water having a color four to five times its normal content.

In the meantime laboratory experiments were conducted to remove color and manganese simultaneously with the ferric sulfate method.

Various well-known color removal methods were tried in the laboratory without success. Relatively large dosages of carbon were added to the water along with the coagulants; activated carbon was suspended in the settled samples; bleaching clays with the coagulants was tried, and sodium aluminate was tried in conjunction with the iron salt and lime. None of these methods gave positive results.

Relatively high dosages of chlorine offered the first possibility of success. The chlorine was added to the water immediately following the introduction of the coagulants, allowing the water to mix the normal time and then settled for a period of five hours. The settled water was then decanted and filtered. Color determinations were made on the filtrate. Chlorine determinations were made on the settled water.

Table VIII
Jar Test to Determine the Effect of High Dosages of Chlorine on Color.
Date: July 19, 1942
Raw Water Color: 250 ppm.
(Results in parts per million)
Chemical Dosages

Jar No.	Ferric Sulfate	Lime	Chlorine	Residual Chlorine 5 hours	Color Filtrate
1	40	40	0	0.00	17
2	40	40	2	0.65	15
3	40	40	4	0.75	10
4	40	40	6	0.80	5
5	40	40	8	1.10	3
6	40	40	10	2.25	0+

The above results are typical of many duplications of this experiment. Dechlorination after contact period did not affect the color.

Our plans now are to provide the necessary equipment for feeding the larger dosages of chlorine followed by dechlorination. This method for color removal in conjunction with manganese removal by ferric coagulation will be put into operation just as soon as the chlorine gas and equipment becomes available.

Summary

1. The occurrence of manganese at Durham is governed principally by the amount and distribution of rainfall throughout the entire year. The maximum concentration of manganese in the raw water may occur at any time from mid-summer to late fall.
2. Eight years of experience shows that good manganese removals can be achieved with the Permanganate Oxidation Method. Crystals of Potassium Permanganate are not available at present for water treatment.
3. Plant results with the ferric sulfate and lime method for manganese removal indicate that it is reliable and highly efficient on moderately colored soft waters. The cost of this method is considerably lower than the Permanganate Oxidation Method.
4. Where soft waters are highly colored, difficulty may be encountered in removing both color and manganese simultaneously by the ferric sulfate method. High chlorine dosages along with coagulants make possible the removal of color and manganese at the same time.

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"AMBERLITES"

Those Remarkable New Synthetic Ion Exchange Resins

One of the most significant recent developments was the discovery by Adams and Holmes in England in 1935 that certain synthetic resins, when correctly formulated and prepared, can function very efficiently as cation *or* anion exchangers.

The entire field of natural and synthetic resins has since been reviewed to discover the most suitable types for use in the purification of boiler-feed water, the elimination of harmful or undesirable constituents in water supplies and mill effluents, the recovery of valuable materials from industrial wastes, and in a multitude of other applications.

Earlier Base-Exchange Materials

The chemical phenomenon of ordinary base-exchange exhibited by the natural and artificial silicates, whereby calcium and magnesium ions in water are replaced by sodium ions, is well known. However, the total dissolved solids content of the treated water is, on the basis of chemical equivalencies, higher than that of the raw water. Furthermore, if the carbonate or bicarbonate content of the raw water is high, the alkalinity after treatment may also be excessive and create new problems.

The treatment of certain carbonaceous materials, such as peat, coal, lignite, wood, etc., with fuming sulfuric acid, chlorosulfonic acid, etc., produced compounds which were also capable of ion exchange. Such materials by acid ingestion may be converted to the hydrogen derivative. With these exchange materials metal ions may be removed from an aqueous medium and replaced with hydrogen ions, whereby the salts are converted to the corresponding acids. The total dissolved solids, and hardness, are thereby reduced. The carbonates and bicarbonates are removed by conversion to carbonic acid, which can be eliminated by simple aeration. The water treated with a hydrogen exchanger can be blended with raw water, or with water treated with a sodium ion exchanger (or both) to secure the water quality desired.

Now, Ion Exchange Resins

The discovery that ion exchange properties are possessed by synthetic resins of certain composition has opened the door to incalculable opportunities for the chemist, since these ion exchange resins may not only be used in all applications in which carbonaceous exchangers have heretofore found employment, but, in addition, have the added properties of very high efficiencies and high capacity. It is possible to select the ingredients used in the preparation of the resin so that modification can be "tailor-made" for particular applications which will be uniform in quality and capacity. These compounds are the so-called "ion exchange resins."

In addition to the cation exchanger, which operates either in the "sodium" or "hydrogen-cycle," the versatility of organic chemistry has led to the development of an entirely new type of exchange-absorbent, the anion exchanger resins, which remove acids from solution. Thus, for the first time, it is possible to remove *all* salts from aqueous solutions.

Nature of the Exchange Process

In order fully to appreciate the significance of this new development, it is necessary to review briefly the fundamental principles of the exchange process.

The two types of ion exchange resins are typified by "Amberlite IR-1," cation exchanger, and "Amberlite IR-4," anion exchanger. The reactions of these products, as used in softening water or for removal of salts from aqueous media, are illustrated by the following equations:

The Cation Exchange Resin

Sodium Cycle

$$2\,NaR + CaSO_4 \rightarrow CaR_2 + Na_2SO_4$$
$$2NaR + MgCl_2 \rightarrow 2NaCl + MgR_2$$
$$2NaR + Ca(HCO_3)_2 \rightarrow CaR_2 + 2NaHCO_3$$

Hydrogen Cycle

$$2HR + CaSO_4 \rightarrow CaR_2 + H_2SO_4$$
$$2HR + MgCl_2 \rightarrow MgR_2 + 2HCl$$
$$2HR + Ca(HCO_3)_2 \rightarrow CaR_2 + H_2O + CO_2\,(gas)$$
$$HR + NaCl \rightarrow NaR + HCl$$

[NaR = Sodium derivative of cation exchange resin.]
[HR = Hydrogen derivative of cation exchange resin.]

The Anion Exchange Resin

Acid Removal

$$2RX + H_2SO_4 \rightarrow (RX)_2 . H_2SO_4$$
$$RX + HCl \rightarrow RX . HCl$$

[RX = Anion exchange resin, with the acid binding substituent X.]

Thus, the cation exchange resin operates either as a sodium or as a hydrogen exchanger and, the passage of water through a double system of "Amberlite IR-1" (in the hydrogen form) and "Amberlite IR-4" yields an effluent comparable to distilled water in degree of purity. Such a treatment is commercially feasible, and "Deionized water" units, which remove all dissolved electrolytes from water by ion exchange, have already been installed. The results obtained have been excellent, but, naturally, there is a limit to the concentration of salt which can be economically removed by this method. As a rule, this method of desalting is economically questionable for waters which contain salts at concentrations appreciably higher than 500 p.p.m.

As with other chemical equilibria, the given reactions are governed by the law of mass action, and the equilibria may be reversed by the use of higher concentrations of the products, that is, in the case of the cation exchange resin, by higher concentrations of salt or acid. This is the principle involved in the regeneration of the exhausted exchanger. It should be noted at this point that the removal of acid by the anion exchange resin is not truly an ion exchange. Actually, the acid is absorbed molecularly, and fixed reversibly. The regeneration of the anion exchanger by means of sodium carbonate neutralizes the acid which had been fixed and frees the base for repeated acid adsorptions.

Acknowledgment: "Amberlite" is the trade name for the new ion exchange resins, produced under an exclusive American license to the original English patents by Resinous Products and Chemical Co. of Philadelphia, in whose praiseworthy technical bulletin captioned *"The Amberlites"* these remarkable synthetic resins are described and interestingly discussed.

CONTROL OF MICRO-ORGANISMS AND AQUATIC VEGETATION

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PUBLIC interest in clean waters has manifested itself in many ways in recent years. Pollution control agencies have been established in many states, and every session of Congress for the past decade has been called upon to consider legislation relating to this subject. Stream clean-up programs have been inaugurated. In rapidly increasing numbers, municipalities have installed modern sewage treatment works. Industries have either proceeded or are being induced to develop and install methods for utilization or treatment and inoffensive disposal of pollutional wastes. The objective of all these efforts is to restore polluted water courses to proper sanitary conditions, and to keep them as clean and attractive as possible.

The purpose in discussing the control of aquatic nuisances by chemical methods, is to present another phase of the general problem of keeping waters clean and attractive, aside from treatment of sewage and trade wastes. The intent is to set forth, briefly, difficulties created by superabundant growths of algae, rooted weeds, and certain obnoxious growths in lakes and streams, and to follow with a review of developments in overcoming some of these difficulties.

Algae may be popularly described as microscopic, one-celled plants produced in immense quantities in shallow water areas under favorable seasonal conditions. Growing in reservoirs, they achieve notoriety as the cause of nauseating tastes and odors in drinking water. The effectiveness of copper sulphate in suppression of algae growths has long been known, but there are certain important considerations involved which must be met in large-scale applications of such treatment to assure satisfactory results. It is also proposed to describe some of the studies that have been carried out under the general supervision of the Wisconsin Committee on Water Pollution through its Committee on Chemical Treatment of Lakes and Streams, with attention being called to methods for more definitely controlling dosages of chemical to prevent unnecessary damage to fish and other aquatic life, particularly fish foods.

General Problems

Under certain conditions, not well understood at present, algae multiply so rapidly that in a number of lakes and streams their presence gives the water a pea soup color and consistency. These algae "blooms" naturally detract from the enjoyment of the waters by cottagers, bathers, boaters, and fishermen because of the stench produced during the decomposition of such masses of algae. Similarly, many weed beds, heretofore ignored or regarded as desirable for the maintenance of good fish population, have become a nuisance and hindrance to the more popular recreational uses of lakes., and the development of residential areas or summer resorts around bodies of water.

Rooted plants growing in abundance in recreational areas have caused much trouble for resort and other property owners. No one enjoys using a beach populated by a dense growth of weeds. Boating is difficult when weeds become wrapped around oars or propeller. Offensive odors result when the plants decompose after they have been cut and washed ashore, or have died in the fall.

Some people are allergic to aquatic plants and develop rashes when they swim in certain weedy areas. Another problem, closely allied to allergy, is caused by a microorganism (*cercariae*), the effects of which are commonly referred to as "swimmer's itch." Outbreaks

Beneath This "Floating Meadow" Is a Wisconsin Lake
Some lakes develop such extensive growths of algae as here pictured. The reasons for this dense growth not being completely known, studies are under way to learn more about the underlying cause for such profuse growths.

One of the Smaller Outfits for Copper Sulphate Spraying of Small Lakes

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One-Man-Power Barge
Applying copper-sulphate treatment to a shallow waterway to control odors from algae growth.

occurring in some bathing areas have annoyed and alarmed persons both directly and indirectly affected.

There is also an economic aspect that must be considered. The decreasing value of real estate bordering infested lakes is a direct loss to owners, and eventually may have a serious effect on tax rolls. Industrial processes have been interfered with at times by algae growths, which have hampered production or caused loss through spoiling the product. For instance, paper mills have had objectionable odors imparted to paper and box-board used for packaging foods and confections by large amounts of algae growing in the water supply used by the mill. There are instances on record where the death of cattle and other livestock has been attributed to the presence of algae in the drinking water. All of these conditions have resulted in efforts by property owners and others concerned to control these algae, weed, and other growths considered aquatic nuisances.

Control Measures

Efforts to eliminate unwanted vegetation have generally utilized manual or mechanical methods. Under water cutting machines have been made available for cutting rooted weeds. The manually operated equipment consists of a ribbon steel saw which can be drawn back and forth across weedy areas. in the manner of a lumberjack's saw. Power cutters mounted on barges, patterned after harvesting machinery, have been developed. Tractor or truck drawn cables have been used to remove littoral vegetation. (See WATER WORKS AND SEWERAGE for March, 1942—"The Control of Water Chestnut Growths.") Cut material must be collected and removed for burning, burial or disposal on land at isolated places. Otherwise, it will drift to shore, decompose and cause an odor nuisance. Dredging generally effects more lasting results than weed cutting, because of removal of the roots.

At best, all of these are laborious, time-consuming methods. They are effective in solving only a part of the general problem of aquatic nuisance control. They do not take care of troubles caused by excessive growths of algae or small free-floating plants.

Early Studies:

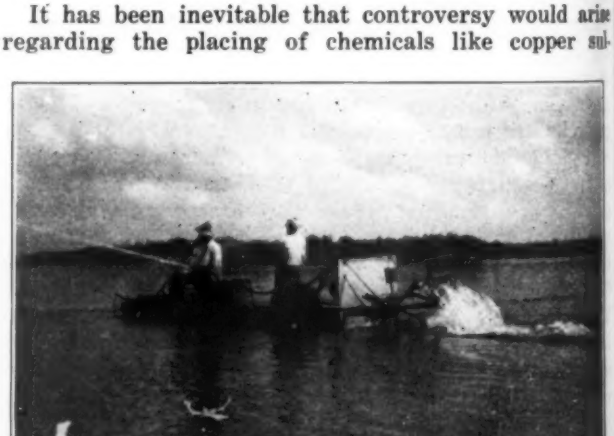
Investigations of chemical treatment were started at an early date to devise practical procedure for taking care of all phases of the problem. Tastes and odors in water supplies having been identified with growths of algae more than sixty years ago, attempts were first directed to overcoming this difficulty. Studies were undertaken by the Bureau of Plant Industry, U. S. Department of Agriculture, in cooperation with the Massachusetts State Board of Health, and in 1901 Moore[1] successfully worked out a procedure for destroying algae with small quantities of copper sulphate. Further studies of the application of this method were reported in 1904 by Caird[2] at Elmira, N. Y., Carroll[3] at Butte, Mont., and Fletcher[4] at Hanover, N. H. Results of the treatment of the reservoir of the Winchester, Ky., water supply, were reported in 1905 by Moore and Kellerman[5]. Additional information was presented by Moore and others[6] during the same year in a symposium conducted by the New England Water Works Association. Prince[7], Caird[8], Kellerman[9], Huff and House [10], Hale[11], and others have added much to the knowledge on this subject following this early work. Ample experience has been gained to date to definitely establish the role of copper sulphate treatment in the control of algal tastes and odors, in water works practice.

Chemical suppression of unsightly and ill smelling algae scums, as a nuisance control measure in lakes and streams used for recreational purposes, has largely developed during the last two decades. A pioneering study in this field was conducted by Alvord[12] at Madison, Wis., who recommended in 1920 that copper sulphate be applied, under competent supervision, in sufficient amounts to maintain the lake waters in question in a clean and attractive condition. Experiments were continued for the next few years by the city and the University of Wisconsin, but it was not until 1925 that suitable procedures and equipment had been devised to carry out an effective treatment program.

Domagalla[13] has described the spraying facilities found most satisfactory, consisting essentially of a solution tank for copper sulphate and a power sprayer mounted on a scow. Use of this equipment supplanted the original practice of dragging burlap bags of the chemical behind a boat, with both more efficient and economical results. Domagalla also mentions his use of arsenical compounds for destruction of a variety of water weeds. In continuing work on the lakes at Madison and elsewhere up to the present, he has further improved the technique of treatment and done much toward placing the control of aquatic nuisances on a sound basis.

Regulatory Measures

It has been inevitable that controversy would arise regarding the placing of chemicals like copper sul-



"Stern-Wheeler"
This barge, for the control of both algae and rooted weeds, is used by a Sanitary District set up by a Wisconsin town for the primary purpose of applying preventive treatment in the control of aquatic nuisances.

Portable Spraying Outfit
This one is being used by the City of Fond du Lac for treating park ponds to keep them clean and attractive during summer months.

phate in waters frequented by fishermen. There have occurred certain instances where misguided enthusiasts, working on the theory "if a little does good, more should do better," have destroyed fish. These mistakes have resulted in demands that all practices of chemical treatment of this nature be prohibited or there be inaugurated adequate regulatory measures.

In Wisconsin, as a result of executive order, a committee was established in 1938 to review the whole problem of algae and weed control and recommend suitable policies and procedures of administration. It was finally determined that the work should be carried out on a continuing basis as one of the functions of the State Committee on Water Pollution, a statutory agency vested with broad powers for controlling pollution.

The 1941 legislature passed an act calling upon the Committee on Water Pollution: "To supervise chemical treatment of waters for the suppression of algae, aquatic weeds, swimmers' itch and other nuisance-producing plants and organisms. To this end the committee may conduct experiments for the purpose of ascertaining the best methods for such control. It may purchase equipment and may make a charge for the use of the same and for materials furnished, together with a per diem charge for any services performed in such work. The charge shall be sufficient to reimburse the committee for the use of the equipment, the actual cost of the materials furnished, and the actual cost of the services rendered plus 10 per cent for overhead and development work. The legislature also passed an amendment to the Town Sanitary District Act authorizing the control of aquatic nuisances by a Sanitary District and providing means for financing such measures.

The Wisconsin Committee on Chemical Treatment of Lakes and Streams consists of an attorney of the Wisconsin Public Service Commission; the chief biologist of the State Conservation Department; the chief chemist of the State Laboratory of Hygiene; and the State Sanitary Engineer of the State Board of Health. Its principal activities have been to obtain all facts available on chemical treatment, institute research to determine procedures to prevent unnecessary damage to fish and fish foods, and establish supervisory control over treatments so that chemicals would be scientifically applied rather than promiscuously used in the waters of the state. Laboratory and field investigations have been carried out with the aid of both special personnel and technical staffs of departments concerned.

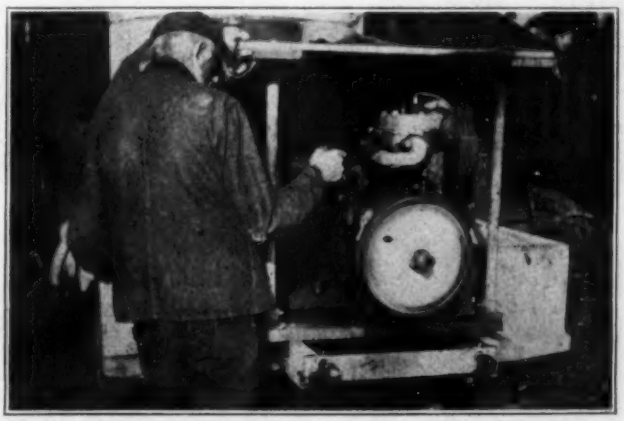
The committee studied the effect of chemicals employed on various species and sizes of fish and some of their food material to determine toxic concentrations. Some of the results obtained are mentioned later. Spraying devices were tested and improved, dusting and broadcasting equipment for spreading chemicals was tried, and various other facilities to aid in obtaining reasonably good control over dosages have been studied. The biological laboratories at state fish hatcheries, and facilities at the University of Wisconsin were made available for this work. The committee has also developed a permit system in the supervision of treatment activities.

Apparatus and Treatment Procedure

During the summer of 1939 the Committee on Chemical Treatment of Lakes and Streams authorized treatment and special studies of several lakes in the state using copper sulphate in order to suppress objectionable algae growths. The first treatments were made with improvised apparatus which was largely of an experimental nature and was later changed somewhat to provide a more convenient means of treatment. A 50 gallon wooden barrel having a partition extending from the top to within six inches of the bottom was used as a solution box. Copper sulphate crystals of approximately pea size were placed in the barrel and hot water from the cooling system of the boat engine discharged into the barrel on one side of the partition. This liquid then passed downward under the partition and into the copper sulphate crystals and upon reaching the other side of the partition was practically saturated with copper sulphate.

A motor driven portable pump was obtained and placed in the boat for the purpose of spraying the copper sulphate solution. Water was drawn from the lake and a small amount of the concentrated copper sulphate solution was introduced into the suction side of the pump. In passage through the pump the solution mixed with a comparatively large amount of lake water before being discharged through two 1 inch rubber hoses equipped with nozzles which were manually operated to spray the dilute copper sulphate solution onto the surface of the lake.

The first treatments were controlled by varying the speed of the boat and the amount of copper sulphate crystals placed in the solution barrel. It was found that this method would dissolve approximately 200 pounds of copper sulphate per hour. Later developments and refinements in the treatment process included the construction of a speedometer which gave an accurate measurement of the speed of the boat and also the installation of a small Venturi meter which



A Trailer Unit
Motor powered spraying outfit for lake treatment mounted on a trailer.

Chemical Solution Tanks and Power Spraying Unit in a Barge
Chemical dosages are controlled by regulating strength of chemical solutions and varying speed of barge travel indicated by a pendulum speedometer. Dosages are checked at intervals by colorimetric tests.

measured the amount of copper sulphate solution being discharged into the suction side of the pump. Later another baffle was placed in the solution barrel and it was found that it was possible to obtain a saturated solution of copper sulphate which did not vary appreciably in strength.

Tables were also made, indicating the amount of copper sulphate necessary for the treatment of a given body of water and it was found that the most satisfactory method of controlling variables was by changing the volume of saturated copper sulphate solution fed into the system. In this way the concentration of copper sulphate sprayed onto the surface of the water could be varied in proportion to the speed of the boat so that the resulting concentration in the lake water could be maintained at any desired figure. In hard water lakes the usual amount of copper sulphate added was equivalent to 1 p.p.m. in the top four feet of water. At the present time the apparatus is being further developed by the construction of a portable photolometer with which the concentration of copper sulphate solution can be accurately checked.

It has been found that one of the most essential steps in treating a lake to suppress algae growths is a survey to determine the concentrations of algae, the areas of the lake which can be most beneficially treated, the hardness and other characteristics of the water, the depth of water, and type of algae present. With this information it is possible to accurately estimate the amount of copper sulphate needed and the areas which should be treated.

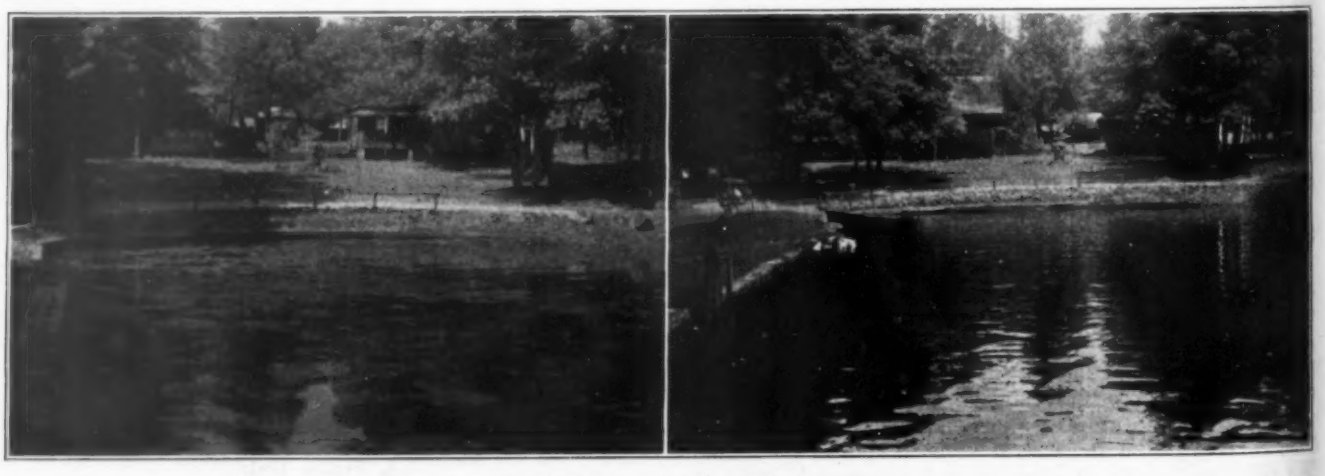
At the present time the Committee on Chemical Treatment of Lakes and Streams has apparatus available for the treatment of such lakes which can be used on a rental basis by any interested party *under direct supervision of representatives of the Committee.* The Committee furnishes supervision of such treatment in order that satisfactory control over the amounts of copper sulphate added can be maintained. A charge is made to Lake Improvement Associations, and other groups sponsoring the work. The program has been quite successful in reducing nuisances from prolific algae growths and has not appeared to be harmful to fish life.

Toxicity of Copper Sulphate to Fish and Fish Food

Numerous tests have been made to determine the copper sulphate dosage required to kill fish. The relation between alkalinity and toxicity of this chemical to fish was shown by experiment under controlled conditions in aquaria, measured in time required to cause death. The relative toxicity of 25 p.p.m. copper sulphate to brown trout fry varied inversely with the alkalinity. With 6 p.p.m. of alkalinity in the water, all fish died in 2.5 hours; with 248 p.p.m. alkalinity there were four survivors after 12.5 hours.

The large discrepancy between the accepted toxic dose for bass (2.1 p.p.m.) and that found in recent studies (160 p.p.m. or more), was explained as follows: The toxic dose of copper sulphate for several species of fish (black bass, yellow perch, sunfish, and bullheads) was determined in distilled water. The values so obtained agree well with those appearing in the literature. Thus, the conclusion must be drawn that the tests of previous investigators had been made in either distilled water or in very soft waters.

Chemical examination of hard water treated with copper sulphate disclosed the fact that the calcium carbonates and bicarbonates react with the copper sulphate producing insoluble basic copper carbonate, which in hard water was shown to be non-injurious to fish. The rate of removal of the copper from solution as a relatively harmless precipitate is not, how-



A Before and After View
Growth of algae on a lake lagoon, and results several days following chemical treatment.

ever, an instantaneous reaction. Several attempts were made without very reliable results to fix exactly the actual rate of removal. In general, however, it was found that the majority of the copper is removed from solution in about one-half hour.

The fish used in the above tests were less than one year old and averaged about 4 inches in length. In order to ascertain whether very young fish were extremely sensitive to the chemical, a test was made with bass fry one and one-half months old and averaging one inch in length. Again the mineral matter of the hard water offered a protective action and these fish were not affected until a concentration of 80 p.p.m. was reached. The results indicate that the young fish are more susceptible than older ones, but that there is still a large margin of safety present between dosages which destroy micro-organisms and those which will kill young fish.

Results of the fish studies with various concentrations of copper sulphate have indicated: (1) The toxic doses of copper sulphate recorded in the literature for the various species of fish are correct only for distilled or very soft waters. (2) The mineral salts of hard waters remove copper from solution as an insoluble precipitate, thus increasing the amount of chemical which may be added before fish are killed. (3) The fatal dose for young large mouth black bass in hard water is 80 p.p.m.; for larger bass approximately 160 p.p.m. (4) Very short exposures of fish to high concentrations of copper sulphate produce high mortality.

Survival of Fish Food Animals in the Presence of Copper Sulphate:

A most important question concerns the effect of copper sulphate on animals other than fish; are certain kinds eliminated from a lake or so diminished as to reduce the fish food supply? A number of experiments undertaken on certain type-organisms in various concentrations of copper sulphate showed the following: Rotifers survive low concentrations but were killed in concentrations ranging from 15 to 1000 p.p.m. within a 30-hour period. Cyclops survived 4 to 15 p.p.m. concentrations for 88 hours, the length of the test. The common flat worm was found sensitive to a fairly low concentration of copper sulphate. All were dead within 24 hours in concentrations of 10 to 50 p.p.m. Amphipods proved to be very sensitive, even to low concentrations, and undoubtedly are reduced in numbers when lakes are given copper sulphate treatment. Species that proved to be very resistant to copper sulphate included the isopods, damsel fly nymphs, water beetle larvae, and caddis fly larvae. In general, experiments and field observations have indicated that most animal organisms are far more resistant to low concentrations than are the several species of nuisance algae. Therefore, the animal organism population will not be seriously reduced or permanently damaged by the methods now in use for controlling algae nuisances.

Relation Between Algal Density and Copper Sulphate Dosage

An experiment was set up to obtain some idea of the rate at which typical algal cells absorb copper from solution. Living plants of *Microcystis* were placed in water of 154 p.p.m. alkalinity in a 5-gallon aquarium. Copper sulphate was added to make a 2 p.p.m. solution. Samples for copper determination were then taken at intervals. The conclusion was that "the amount of copper removed from solution by *Microcystis* is extremely small." Hence, for the control of this organism it appears that it should not be necessary to increase the concentration of copper sulphate above 1 p.p.m. when treating lakes which have passed into an advanced bloom stage.

Swimmer's Itch

In the matter of "Swimmer's itch," tests have shown the possibility of control of this difficulty by chemical treatment under certain circumstances, and accordingly the committee has been giving consideration to control of this nuisance as one important phase of its activities.

The most serious aspect of swimmer's itch probably is its detrimental effect on resort business. So far as has been determined, all cases of this type of skin irritation that have occurred in Wisconsin can be attributed to a single cause; namely, the accidental penetration into man's skin of the larvae of schistosome flukes (flatworms). These larvae, having developed in snails, emerge into the water where they will die unless they encounter the proper bird or mammal in which to complete their development. The infested birds and mammals in turn scatter eggs of the worm, which hatch and undergo development when they enter the snails.

This knowledge of the life cycle of the organisms causing "swimmer's itch" (more exactly termed schistosome dermatitis) is important because it suggests possible points of attack in attempts to control the disease. Since the presence of this disease is of some economic importance to the state, studies have been carried out with the object of determining possible methods of controlling or combating the condition. The more important facts that have been learned to date will be presented here. A more extensive account of the researches substantiating the statements made have been published by Brackett (see References 14-19 inclusive).

Investigations in Wisconsin during the summer of 1938 and reliable accounts of the occurrence of this disease in earlier years indicate that, with the exception of a few localities, only a relatively small number of individuals are ordinarily affected. With such being the case, it is obvious that control measures that are at all extensive or expensive cannot usually be justified. In these places where other control methods are impracticable, it may prove helpful to bathers if they rub themselves briskly and thoroughly with a towel immediately upon coming from possibly infected water and before the water has time to be removed from the skin by evaporation. Apparently most of the larvae penetrate while evaporation is taking place in the thin film of water covering the body. The rubbing crushes them while they are still on the surface of the skin before they have penetrated.

Particular attention is called to this prophylactic measure because it is simple, costs nothing, and puts the responsibility directly on the persons concerned. Likewise it is a procedure that can always be used anywhere, regardless of varying environmental conditions, a fact which is not true of other control measures to be discussed. At present the possibility of controlling the parasite during the mammal phase of its cycle is remote. Methods designed only to kill the larvae in the water would be temporary since the snails may shed great numbers of the larvae for a period of several weeks.

To eliminate the host snails, involved in outbreaks of "swimmer's itch," is undoubtedly the most effective and permanent method of preventing this annoying condition. It is evident from the absolute essentiality of snails in the life cycle of this parasite that the snail stage is a vital point for attack. The bulk of the studies

have therefore been made on snails and their relationship to the disease. Amounts of copper carbonate as small as 3 lbs. per thousand square feet of bottom area have been used to kill the snails.

Rooted Weed Control

The elimination of rooted weeds involves the use of sodium arsenite which is a more dangerous chemical than copper sulphate. Arsenical compounds are considered as poisons. A dilute solution is sprayed onto the surface of the water over the plants. The plant is killed by the arsenic absorbed through the leaves and carried to the roots. The dosage depends on the weeds to be destroyed. The treatment is permanent until the area is reseeded. Experiments showed that fish (bluegills) can live at least six days in a solution that contains sufficient arsenic to kill plants. Further research showed that large mouth bass survived 232 hours in the presence of 6 p.p.m. Survival of 87 per cent was had in a 10 p.p.m. solution. Croppies and bluegills were unable to stand a 15 p.p.m. solution of arsenic.

During the summers of 1940 and 1941 the Committee on the Chemical Treatment of Lakes and Streams conducted a series of experiments in order to determine the practicability of using "Benochlor" products for the eradication of rooted aquatic weeds in the State of Wisconsin. Three Benochlor preparations used were Benochlor 3, Benochlor 3 T.D., and Benochlor 3 Special.

The following results are submitted as a progress report, inasmuch as the submission of a detailed final report is anticipated. Twenty-four test areas were set up in six bodies of water, some area being enclosed by a canvas fence supported by net floats and weights at the bottom to hold the fence in place. This permitted definite control of the area treated.

In no cases were very promising results obtained with Benochlor.[3]

In concentrations as low as 100 p.p.m. Benochlor 3 T.D. was effective in killing *Vallisneria, Potamogeton, Anacharis, Chara,* and *Myriophyllum* within 20 days. Further investigations will be made to determine the most desirable concentration to use.

In concentrations as low as 40 p.p.m., Benochlor 3 Special was effective in killing *Anacharis, Potamogeton, Zannichellis, Myriophyllum* and *Vallisneria* in 15 days. For Benochlor 3 Special or Benochlor 3 T.D. the weeds mentioned as being killed were the only ones present in the treated areas. Further investigations will need to be made to determine the toxicity of these compounds to aquatic fauna.

Conclusion

The Wisconsin committee realizes that chemical treatment of lakes and streams is a somewhat controversial subject and that there are many different factors to consider. Studies will probably provide the answers to many of the questions raised. Accordingly the committee believes it has an important function to perform and that the correct administration of the chemical treatment of waters to control algae and rooted plants is a service to the citizens and guests of the state which will prove of great recreational and economic value, and that these treatments can be applied without any serious effects on the fish population.

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19. Brackett. "Studies on Schistosome Dermatitis. VIII. Notes on the Biology of the Snail Hosts of Schistosome Cercariae in Wisconsin and Epidemiological Evidence for the Life Cycles of Some Avian Schistosomes." Amer. Jour. Hyg., 32 3, Sect. D, 85-104, (1940).
20. Lieber. "The Control of Water Chestnut Growths." Water Works and Sewerage, 89, 95-98, (March 1942).

North Dakota Professional Engineers to Be Licensed

An act providing for the registration of professional engineers was passed by the North Dakota legislature and approved by the Governor. Effective July 1, the new law makes North Dakota the 46th state to require registration of professional engineers.

The North Dakota act conforms quite closely to the model law which has been approved by nearly all of the national and regional engineering societies.

Governor Moses has appointed Jay Wesley Bliss, City Manager, Minot; Alexander Carothers Burr, Consulting Engineer, Jamestown; and Clifford Johnson, Bridge Engineer, State Highway Department, Bismarck, to the three-member State Board of Registration for Professional Engineers.

New England Sewage Assn. to Meet Sept. 22 in Boston

Symposia on Small Plants and High Rate Filters to Be Featured

At the Fall meeting of the New England Sewage Works Association to be held at the Parker Hotel in Boston, Mass., on Sept. 22, a symposium will be held on problems of design and operation of small sewage treatment plants.

Another symposium, at the same meeting, will be held on the subject of operation and design of high rate trickling filters. This part of the program will be presided over by Samuel M. Ellsworth, consulting engineer of Boston, and Army officials having experience with this type of filter will participate.

The operators section of the meeting has been scheduled to include these subjects: "Servicing of Gas Burning Equipment," "Best Size Openings for Bar Screens," "Wire for Vacuum Filters," "Maintenance of Booster Pumping Stations," and "Suitable Kinds of Lime to Use for Sludge Digestion Control."

Efforts are being made to secure a motion picture from the U. S. Army on the work of sanitary engineers in war time. All of which constitutes an ambitious one day program well worth attending.

PENNSYLVANIA WATER OPERATORS MEET AT HARRISBURG

A Report

By GEORGE E. SYMONS
Associate Editor

DESPITE the fact that there was no meeting held last year and without the lure of State College, this meeting on June 8 of the Pennsylvania Water Operators

Presidents

(New) *James G. Griffith, Manager, New Kensington*

(Retiring) *Harry J. Krum, City Chemist, Allentown*

Association, with more than 215 in attendance, was proof that the meeting counts as well as the pleasant atmosphere of the campus of State College.

Business Session

Exactly on time, I. M. "Mike" Glace, organizer and perennial Secretary-Treasurer, called the members into the meeting room. There having been no meeting in 1942, the officers had served a two years term. Harry Krum, of Allentown, declaring that he would refuse to run for a "third term," the following members were elected as officers:

President
James G. Griffith, Manager
New Kensington Water Co.
First Vice President
H. E. Moses, Chief Engr.
Pa. Dept. of Health, Harrisburg
Second Vice President
R. B. Adams, Chemist
Penna. Water Co., Wilkinsburg
Secretary-Treasurer
I. M. Glace, Cons. Engr.
Harrisburg

In response to an invitation from H. Lloyd Nelson on behalf of the N. J. Water Operators Association and the 4-States Section of AWWA, the Pennsylvanians voted to cooperate and meet with these two associations at a joint meeting to be held during October in Philadelphia or in Atlantic City if hotel accommodations become available because of army release of hotels now occupied.

Victory Alum

Under the guidance of L. L. Hedgepeth, of Philadelphia, the question of "What and Why is Victory Alum?" (and how it is used) was taken up in a symposium during the morning session. Hedgepeth introduced the topic by relating the reasons for the production of alum of lower than AWWA specification grade.

"Victory Alum" as a wartime coagulant is a sub-grade alum produced from low-grade bauxite ores, because the available high grade bauxite ores must be used for the production of aluminum for more critical war uses. Lack of shipping and capture of Far East supplies have meant that the available American high grade ore must be conserved. W.P.B. issued an order restricting the use of bauxite for filter alum to ores containing not less than 15 per cent of silica and other insolubles.

In order to use this material the manufacturer has had to produce an aluminum sulphate relatively high in insoluble materials or else the production capacity of filter alum would have had to be cut as much as 50 per cent. The AWWA has, in consequence, revised its specifications for filter alum for the duration according to these limits.

Item	*Std. Specs.*	*War Specs.*
Sol Alumina	17.00%	14.0%
Iron	0.75%	2.3%
Insolubles	0.50%	15.0%

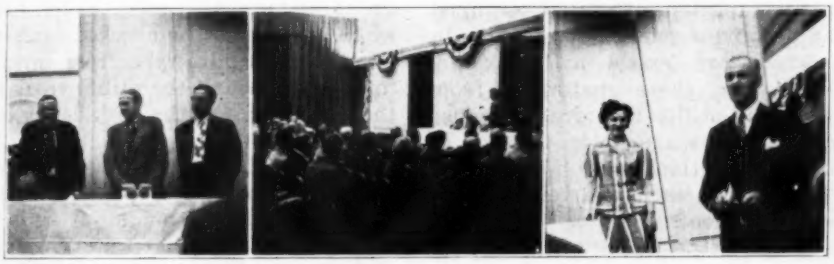
This new specification is not the same as grade B alum which allowed 7.5 per cent insolubles but no decrease in alumina content.

Mr. Hedgepeth reported on the average analyses of 10 "Victory Alums" from different sources as follows:

Item	*Max.*	*Min.*	*Avg.*
Alumina ...	16.20%	14.90%	15.60%
Iron	0.96%	0.17%	0.37%
Insolubles ..	3.36%	8.99%	6.08%

Obviously the alum had been degraded, but whether it has been degraded too much is answerable only by plant operators. The following operators gave reports on observations to date:

H. J. Krum, Allentown, R. H. Heister, Reading, R. B. Adams, Wilkinsburg, J. C. DeGroot, Northampton, Mr. Regester, Kennett Square, and N. G. Young, Phoenixville. General observation was that "Victory Alum" would produce the proper coagulation of waters, often with lesser dosages, but sometimes with slightly greater dosages than for standard alum. Because of the more acidic character of the "Victory Alum" pH lowering was generally obtained with less alum. The presence of relatively greater insoluble matter universally required more attention to equipment in order to maintain it in clean and proper operating condition.



Shot in the Sessions
(1) *New officers—"Jim" Griffith, Pres.; "Ted" Moses, 1st V. P.; R. B. Adams, 2nd V. P.*
(2) *Hedgepeth on "Victory Alum"*
(3) *Glace presents Columbia Water Co.'s newest meter reader, Veronica Wolpert*

The Secretary
"Mike" Glace, with his family of charm

Some Alum Producers Opinions

In comments from the floor on these reports, manufacturers' representatives pointed out that the degree of grinding of the bauxite used in Victory Alum production is important, and that the silica content present had important bearing on the degree and fineness of grinding. The silica content is not stable, and the alum therefore cannot be dried as well as standard alum. In consequence, the grinding cannot be done as well as in the case of standard alum; repairs are more frequent, and the cost of operation goes up. Silica present also absorbs the heat of reaction, and therefore acid conversion of the alumina to sulphate is not as good. The material is generally more acidic, which accounts possibly for the smaller amount of victory alum needed to lower the pH value in coagulation.

This reporter raised the question as to whether or not a manufacturer could make a tailor-made alum, inasmuch as several of the observers seemed to indicate that the victory alum, with its insolubles or additional acid (or both) gave better results. Mr. Hedgepeth's reply was that manufacturers have several reasons for not making tailor-made alum, the main one being that it is not profitable. Particularly is this true in the case of introduction of acid radicals into the alum. In the case of insolubles, or coefficient of fineness of grinding, Mr. Hedgepeth admits that possibly a manufacturer could run off a batch to suit the particular operator if it were found that such special grinding proved sufficiently advantageous to justify the additional operation.

Governmental Regulations and Priorities

Arthur E. Gorman, Chief, Water Division, Office of War Utilities, Washington, spoke on the subject of governmental regulations and priorities on water works, stating that water utilities now have an AA-1 priority not enjoyed by many. As of May 31, 1943, restrictions regarding inventory have been returned from the U-1 base to the old P-46 base. The U-1 order is now being simplified and redrafted to meet the requirements of water utilities. (It was issued only a day or two after the meeting but is also going through a still further revision and simplification.—Ed.)

New developments in the matter of governmental regulations include the shift from old style priority to the Controlled Materials Plan. A budget system now exists where anyone with a priority and a CMP allotment is assured of getting materials. Steel, copper, and aluminum are now controlled to balance productive capacity with pre-determined and permitted consumer demands. In reality there exists a "bank account" for these materials from which any utility may draw, because each claimant agency in the C.M.P. plan of allocation knows how much it will have in each quarter to meet estimated needs.

As to the future, Mr. Gorman remarked that we are now going from construction to production. The interim lull which exists in materials demand in civilian operations at the moment won't continue, because production will pick up. Mr. Gorman stressed an all important consideration for the present. That is the possibility of a critical drought period which may be extremely serious in areas of high war production. Plant managers in such areas should take stock of the situation, and advise the Office of War Utilities of any additional equipment or supplies that will be needed to prepare against the possibility of a rainfall deficiency. This may involve an additional emergency source of supply and the required works and transmission lines or the provision merely of additional storage.

Mr. Gorman further requested that all utilities should cooperate with the government in otherwise deferring capital improvements as far as postponement is permissible. The War Production Board cannot do much in the next year except for those who have to produce for war. In this consideration it appears timely for water works operators to put on a conservation program for water, and thereby eliminate as far as possible any need to increase plant capacity to meet maximum demand. First, however, comes assurance that in all critical areas any real needs for bridging a drought gap will be met in advance.

Following Mr. Gorman, Lloyd Nelson, Asst. Chief, answered a number of questions regarding priorities and critical materials. Curb stock repairs materials may be kept up to and including the meter, but when used, must be checked against allowable withdrawals from inventory, even though the utility charges the customer for the installation or repair.

The Controlled Materials Plan applies to every water system which sells water to the public. If an industry provides free water to employees a CMP allotment is not necessary, but if the employees rent their houses with water service included then the industrial supplier becomes a water utility operator, subject to a CMP priority and the U-1 order.

Mr. Nelson explained that a new simplified form was being prepared to replace the complex P-200 and also the PD-1A. Since the length of time to process an application depends first on the size of the project, and second on the amount of information given, it behooves water utility operators to give complete information in the first letter and application in order to obtain the 48 hour service which is possible.

The Copper Recovery Branch may soon ask all utilities how much copper is on hand, with the idea that it may be required for war use.

(1) (2) (3) (4) (5) (6) (7) (8)

Programmers All

(1) W. R. Schnabel, Supt. & Engr., Bureau of Water, Allentown, Pa. (2) R. H. Heister, Chemist, Bureau of Water, Reading, Pa. (3) J. C. De Groot, Mgr., Northampton Water Co., Northampton, Pa. (4) R. B. Adams, Chem. & Bact., Penna. Water Co., Wilkinsburg, Pa. (5) L. L. Hedgepeth, Tech. Dir., Penna. Salt Co., Philadelphia, Pa. (6) Arthur E. Gorman, Chief, Water Branch, Office War Utilities, Washington. (7) Norman G. Young, Boro Manager, Phoenixville, Pa. (8) H. E. Beckwith, Distr. Engr., Pitometer Co., Pittsburgh, Pa.

Whereas, all utilities are subject to the U-1 order, only those of 50,000 or more population must report inventories. The smaller plants should try to locate their needs through the State Water Coordinator.

Manpower Situation

P. B. Niles, Personnel Director of the American Water Works & Electric Co., New York, spoke on the manpower situation. Water works employees always have had stable jobs, although not such high pay; and, whereas, industry has reported a 7.6 per cent turnover of men each month, the water utilities have had no such marked turnover.

On the other hand, it is reported that while at Muncie, Ind., it is impossible to obtain men to do labor, there still is a nucleus of a group of loyal men in the water works field who are sticking with the utilities. For them, Mr. Niles said, a superintendent should have at least a pat on the back. Maybe that won't keep them, but it will help. To discourage men going to other industries, Mr. Niles suggests that no releases be issued on the employee (as required by law) until a replacement is available. As a general thought, Mr. Niles believes that the water utilities "hide their light under a bushel far too much," and that whereas there is nothing spectacular about the water industry, and its place in the war, no war plant can operate without the operation of the water plant, and therefore the water utilities should be more vocal in bringing their contributions and their problems of the day to the attention of the townspeople.

Conservation of Water and Materials

W. R. Schnabel, Chief Engineer and Superintendent of Bureau of Water, Allentown, Pa., read a paper entitled "Conservation of Materials Through Conservation of Water." In a survey of the Allentown water distribution system, one hundred and ninety leaks were located with a leak loss of 3,170,000 gallons per day. In addition, leaks amounting to 158,000 gallons per day were found in house connections and 330,000 gallons per day loss was observed in industrial plants. Two hundred and fifty defective valves were found and most of them repaired. The cost of the survey was $21,083, and the cost of the repair work, $29,510, at an average of $1.72 per mile of main covered.

The savings resulting from this survey include $2,500 a year in alum going into previously wasted water, and $10,000 a year in coal and power, and it is estimated that the value of the water saved from leakage alone is $46,110. Power value saved is 2,307, unauthorized usage of water was equivalent to $4,234, and under-registration of meters was equivalent to $4,818 per year. The increased revenue is estimated to be $11,000 a year.

PENNA. SEWAGE OPERATORS HEAR OFF THE RECORD TALKS

OFF the record papers by Maj. Rolf Eliassen, Col. W. A. Hardenburgh, and A. M. Rawn, Govt. Division of W.P.B., featured the sixteenth meeting of the Pennsylvania Sewage Operators at Harrisburg on June 9. Like the water works operators meeting the day before, this was the first meeting not held at State College, Pennsylvania, in many years.

Presidents

(Retiring)
E. B. Swinehart
Pottstown, Pa.

(Incoming)
T. S. Bogardus
Berea, Ohio

The meeting was welcomed by the Mayor of Harrisburg, who recalled early school days when he and L. D. Matter, vice president of the Association, went swimming in the river nearby the city, often finding that at the foot of certain streets the water was warmer than elsewhere. Although sewage treatment does not exist at Harrisburg, the inception of an interceptor system has apparently eliminated the "bathing beaches" which were the delight of small boys a quarter of a century ago. He said that Harrisburg is planning to do something about this matter of dumping untreated sewage into the Susquehanna.

Army Sewage Plants

Major Rolf Eliassen, U. S. Corps of Engineers, North Atlantic Division, New York, spoke at some length on experiences in operating sewage treatment plants in the North Atlantic Division. While his paper was not for publication, his remarks covered the various types of plants in the area, including septic tanks, Imhoff tanks, slow sand filters, primary treatment, low rate filters, high rate filters, and activated sludge plants. Major Eliassen also spoke about the several problems that have arisen in connection with the operation of these various types of treatment plants, and the problems involved in the necessary conservation of water, and the difficulties with grease. A few results from the operation of a slow sand filter and of a biofilter were given. In both instances the results were excellent—the biofilter giving results unequalled by most activated sludge plants. Slides were shown of the Mobile Trailer Laboratories used in connection with surveys in the Division.

In discussing Major Eliassen's paper, Leonard Langford, of the Pacific Flush Tank Company, gave a good idea of several of the problems which have been encountered in plants of that type by reading an inspection report of one particular plant (not an army plant).

Among other difficulties observed, was that grit had lodged in almost every tank, trough, and conduit.

1st Vice-President
L. D. Matter
Harrisburg, Pa.

Federation Director*
F. D. Friel
Philadelphia, Pa.

**A little sleuthing uncovered the fact that the new Federation Director was the anonymous donor of the $100 which brought the Association out of "the scarlet" into the pink of financial condition once more.*

Odors were prevalent due to the pumping of secondary sludge to sand filter beds. Floating material had passed onto the filter. Bypassing of the sewage to keep the sand out of the digesters had filled the chlorine contact tank with sand. The boiler had been fractured. Such problems as these are not prevalent at all at the camps, but one or more of them may occur.

Secy.-Treas.
Bernard S. Bush
Wilkes-Barre, Pa.

Editor
J. R. Hoffert
Harrisburg, Pa.

Mr. Langford concluded with the suggestion that Army plants have made possible the comparison of different types of treatment, and have also made possible the collection of data and information which should be of value to the designer and the operator of sewage treatment plants after the war.

Business Meeting

Upon the presentation of the slate of officers, it was unanimously voted that the following persons be elected for the ensuing year. President, T. S. Bogardus, Berea, Ohio; First Vice President, L. D. Matter, Harrisburg, Pa.; Second Vice President, William Murdoch; Secretary-Treasurer, B. S. Bush, Wilkes Barre Pa.; Federation Director, F. S. Friel, Philadelphia; Editor, J. R. Hoffert, Harrisburg. It was decided by members in the meeting to carry all soldiers as inactive members in good standing. Mr. C. A. Emerson was elected an Honorary Member.

At the luncheon, H. E. Moses, Chief Engineer Pennsylvania Department of Health, Harrisburg, acted as toastmaster, and remarked that it was just one day more than the celebration of his thirty-fifth anniversary with the State Department of Health. Mr. Moses introduced Arthur S. Bedell, Chief of the Bureau of Sewage, N. Y. State Department of Health, who, as immediate past president of the Federation of Sewage Works Associations, spoke on Federation affairs. Mr. Bedell paid tribute to both C. A. Emerson, long time President of the Federation and Mr. H. E. Moses, long time Secretary. Both had served the Federation for 15 years before its reorganization.

Mr. Bedell spoke of the membership drive which is in progress, and of the $25 war bond which will be given to the person obtaining the most members. Mr. Bedell also put in a plug for the Federation meeting, October 21-23 in Chicago.

(1) (2) (3)

(1) *Wilson Caldwell, Chief Plant Operator, Ephrata, Pa.*
(2) *R. B. "Bob" Mowry, Dist. Mgr., W. & T., Philadelphia, and Jim Allen, Engr., Incodel, Inc., Philadelphia, Pa.*
(3) *Carl N. Fuehrer, Boro Mgr., Ephrata, Pa.*

The Sanitary Corps

Colonel W. A. Hardenburgh, of the Sanitary Corps, spoke on Army affairs and gave a good resume of the part which the Sanitary Corps with its 1666 commissioned officers is playing in the Army. It was apparent from Colonel Hardenburgh's talk that modest though he was, the Sanitary Corps had developed into a unit of some importance and deserving of recognition through his efforts. There was considerable favorable comment in the corridors of the hotel after the luncheon concerning this improved status of the Sanitary Corps in the Army.

Afternoon Session

Governmental regulations and priorities on sewage were discussed by A. M. Rawn. The work had not yet been completed, and the decisions and regulations not yet revised, but Mr. Rawn explained what he hoped to accomplish in the way of revamping the utility orders to apply to sewage, and the elimination of unnecessary forms. After two months of intensive work, it appears that the revised program is ready for adoption, and knowing Mr. Rawn's ability to get at the "kernel of the nut", we feel sure that in another two months the sewage plant operators will find it much more simple to obtain material for operation, and, if necessary, addition and construction of sewage plants.

Luncheon Speakers

Col. W. A. Hardenburgh
Sanitary Corps
U. S. Army
Washington, D. C.

Arthur S. Bedell
Past Pres.
Fed. Sew. Wks. Assns.
Albany, N. Y.

Persons who desire information on the matter, should write to A. M. Rawn, Head Consultant, Sewerage and Sanitation Section, Governmental Division, War Production Board, Washington, D. C.

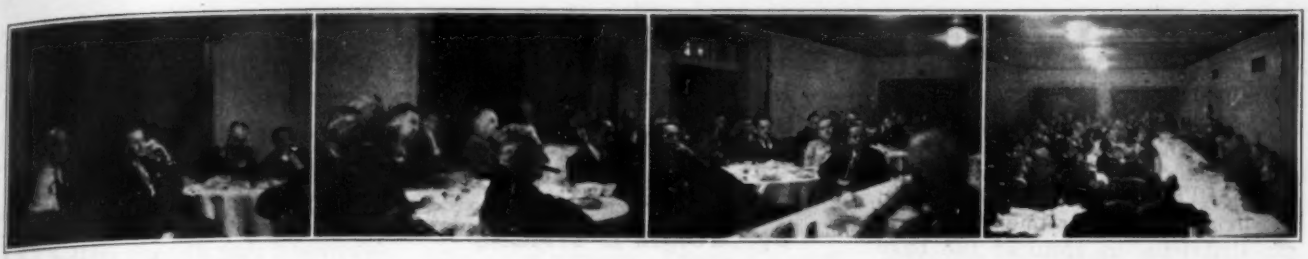
Reducing Strategic Material In Treatment Plant Design

Mr. C. L. Siebert, Executive Engineer, and F. B. Milligan, Industrial Engineer, of the Pennsylvania Department of Health, presented a

(1) (2) (3) (4) (5) (6) (7)

Listeners, Speakers, Diners

(1) *Harry J. Krum, Allentown, listens to Rawn on Priorities.*
(2) *Major Eliassen, U. S. Army Engrs., speaks on Army sewage plants.*
(3) *F. B. Milligan, Penn. Dept. of Health, reads another's comments on his paper.*
(4) *Annual luncheon.*
(5) *C. L. Siebert, Penn. Dept. of Health, tells of designs for saving critical materials.*
(6) *A. M. Rawn, Head Consultant,, Sewerage Section, Govt. Div. W.P.B., "Sewerage Priorities."*
(7) *Secretary Bernard S. Bush, Wilkes-Barre, lends attentive ear.*



Annual Luncheon

Audience listens to perennial Toastmaster Harry E. Moses holding forth at head table. ("Ted" had just completed 35 years with the State Dept. of Health.)

paper on the "Solving Wartime Pollution Problems with Minimum Use of Strategic Material." Among the possible substitutions of non-critical material in the design or construction of sewage or industrial waste treatment plants, Mr. Siebert mentioned the following: Wooden flumes or terra cotta pipe for critical iron; wooden screens for bar screens; stop logs, plug valves and stone or concrete balls in the place of shear gates. Other possibilities, more or less primitive, but still effective for even a long period are earth banks for lumber; ditches for pipes; and non-reinforced concrete tanks; wooden sludge collectors; homemade revolving arms; and floats made from bottles or jugs.

Still other suggestions made by Mr. Siebert were the use of digestion tanks of non-reinforced concrete with wooden cover and live steam heating, and the use of earth lagoons for secondary tanks, with the addition of sodium nitrate to the lagoons to keep them fresh and reduce the BOD.

In the absence of Mr. Stephen A. Kowalchik, Senior Sanitary Engineer, New Jersey State Health Department of Trenton, Mr. F. B. Milligan, co-author of the paper, read the discussion prepared by Mr. Kowalchik. From the tone of the paper, it was gathered that Mr. Kowalchik believed many industries were offering the lack of critical materials as an excuse for not building treatment plants. Mr. Kowalchik didn't agree that critical materials should be eliminated from construction of treatment plants, but did believe that industry should not only construct the plants, but make them permanent. Where possible, Kowalski believed that critical material should be saved, but he did not believe that makeshift plants should be constructed because of the lack of critical materials.

Approximately 115 persons attended the meeting, which was the Sixteenth Annual Conference of the Pennsylvania Sewage Works Association. There was no meeting held in 1942. As in the case of the Conference of Water Works Operators' Association, there was much comment to the effect that even without the State College Campus as an attraction, the attendance was very good.

Now, Two-Job Man

C. C. "Swede" Larson has been named to the position of Chief Chemist of the Water Department of Springfield, Ill., to replace Charles Spaulding, resigned. Larson will fill the new position in addition to being Chief Chemist and Asst. Mgr. of the Springfield Sanitary District, a position he has held for 14 years.

C. C. Larson

At one time Chief Chemist for the Illinois State Department of Health and a veteran of the last war as a member of the water supply service in France, Mr. Larson is well known as an active and energetic member of the Central States Sewage Works Association of which he has been president. He is to our knowledge the only sanitary chemist who is a Concert Meister of a symphony orchestra, and in addition a director of the University of Illinois Alumni Association where he was graduated in 1918.

Correction!

(For Reference & Data Number)

We are indebted to Mr. George L. Loelkes, Sanitary Engineer of Springfield, Mo., for calling to our attention an error in the "Conversion Factors for Engineers" appearing on page 269 of the Reference and Data Section of our June 1943 issue.

The 11th line in the right hand column should read—Multiply Gallons/min. by 2.228×10^{-3} to obtain cubic feet/sec., *not* 2.228×10^{-8}, as shown. Will readers please make this correction by changing the —8 to —3.

In attempting to trace this error we find that it appears in the original copy and, therefore, the same correction is needed for all issues prior to 1943 which contain this table of "Conversion Factors."

If any reader has discovered other errors in our Reference and Data material we will deem it a decided favor to have such errors brought to our attention promptly.

Water and Sewage Works Construction Volume 1925-1942

(Millions of Dollars)

	Waterworks‡	Sewerage§
1925	$ 71	$ 85
1926	62	104
1927	54	118
1928	100	101
1929	49	88
1930	49	83
1931	57	73
1932	35	25
1933	67	22
1934	92	61
1935	81	100
1936	92	121
1937	104	95
1938	131	136
1939	163	160
1940	70	91
1941	77	89
1942	151	118

* From Engineering News Record's Engineering Construction Reports.

‡ Includes all items over $15,000.

§ Includes all items over $25,000.

NEW ENGLAND SEW. WKS. ASSN. SPRING CONFERENCE

A REPORT

By GEORGE E. SYMONS

Associate Editor

IN SPITE of a downpour of rain, in spite of wartime travel restrictions, in spite of the busy tempo of the time, seventy-eight persons attended the Spring Conference and Annual Meeting of the New England Sewage Works Association, held in New Haven, Conn., May 26. Interest was lively in all parts of the program including an inspection trip to one of the municipal sewage disposal plants.

Presidents

Outgoing—
Prof. Roscoe H. Suttie
New Haven, Conn.

Incoming—
Joseph A. Muldoon
Bridgeport, Conn.

At the business meeting LeRoy W. Van Kleeck reported that to date the association had shown a net loss of but one member; a record that is a credit to Mr. Van Kleeck's secretaryship. J. A. Muldoon, first vice-president, reported for the Committee on Operators' Salaries. At the present time chaos is too great to obtain good data on this subject but the committee is trying to obtain information on salaries of operators, working days per year, sick leave, vacation leave, number of hours per day, and other pertinent items. When completed, the report will be made available to all members.

Following nomination by committee, the Secretary was instructed to cast a unanimous ballot for the following members who will take office next January first.

President: Joseph A. Muldoon, Bridgeport, Conn.

First Vice President: Frank L. Flood, Boston, Mass.

Second Vice President: George H. Craemer, Hartford, Conn.

Directors: Charles H. Copley, Hamden, Conn.; Charles G. Richardson, Providence, R. I.; Edward Wright, Boston, Mass.

Secretary-Treasurer: LeRoy W. Van Kleeck, Hartford, Conn.

Technical Session

Prof. Roscoe H. Suttie of Yale University, and President of the Association, introduced the first speaker, J. Henry L. Giles, Sr. Sanitary Engr., Conn. State Dept. of Health. Mr. Giles spoke on "Inlet and Outlet Design for Sedimentation Tanks," and pointed out that plants often do not have the proper design capacity, for one reason or another. Detention periods in such tanks can not be increased but it is often possible to increase flow—through time and sedimentation efficiency by improving inlet and outlet design. There are three types of sedimentation tanks, depending on the flow direction, longitudinal, radial, and upward. The first has been the most popular with designers and Mr. Giles confined his remarks to that type of tank.

Vice-Presidents

First
Frank L. Flood
Boston, Mass.

Second
George H. Craemer
Hartford, Conn.

The simplest form of inlet is the straight pipe or narrow opening at one end of the tank. These inlets give the poorest characteristics for sedimentation and result in the greatest short-circuiting. The simplest improvement to this type of inlet is to place a baffle about four feet from the inlet and direct the flow downward. At the outlet end a baffle at the surface will trap floating solids. "T" or elbow inlets are modifications of this baffle principle. This type inlet works best for narrow deep tanks where the length is six to eight times the width and the depth twice the width. Disadvantage is that flow when directed downward may disturb settled solids or short circuiting may occur at lower levels.

Modifications of Simple Inlets

Among several attempts to improve design of simple inlets have been multiple inlet ports, submerged, with or without baffles; a double elbow to direct the flow back against the inlet wall; and placing a target baffle in front of the inlet port, thus stopping the forward velocity without directing it all downward. For long tanks with relatively low flows this latter design is fair to good. Outlet design at most plants has consisted of a full width plate or sawtooth wier, to obtain equal distribution across the outlet end.

One of the major changes in design was that of Mr. George Hubbel, Cons. Engr. of Detroit, who increased efficiency 50 per cent while decreasing detention period by more than 70 per cent. In this design the entire flow is submerged previous to sedimentation and is divided evenly to different tanks by means of orifice plates in the inlet wall. The flow is directed upward in an ever-increasing pyramidal section, so that inlet velocity is practically reduced to zero and the flow distributed across the entire width of the tank. The top of the inlet device is submerged about 1.5 ft. and has a flare lip to distribute the flow over the vertical depth of the sedimentation chamber. This design gives maximum distribution over the cross section of the sedimentation tank with a minimum inlet velocity.

Mr. Giles also described the multiple orifice plate baffle inlet proposed by Prof. Camp of M.I.T. In

Sec'y-Treas.
Le Roy W. Van Kleeck
Hartford, Conn.

Director
C. G. Richardson
Providence, R. I.

this baffle many orifices are placed at predetermined points over the whole inlet wall surface. Plugging of these ports is one disadvantage, but, theoretically, good distribution over the cross-section is obtained.

Outlet wiers to improve sedimentation, have consisted of moving the baffle to the halfway point to avoid vertical lift at the outlet end. Outlets provided with double take off wiers on both sides of the outlet channels, or multiple takeoff wiers have also been used. Reference was also made to the work in New York City where an outlet wier was placed near the inlet. (See article by R. A. Gould in the April issue of WATER WORKS AND SEWERAGE.)

Several miscellaneous ideas were presented by the speaker and various persons discussing the paper from the floor. Among these were, sloping inlet and outlet walls, installing stilling basins where intermittent pumping takes place at relatively high velocity, adjusting the flow equally to different tanks in a battery by baffle raising or lowering, and stepping down inlet conduit size along tank inlets to prevent the rushing of solids to one end tank.

Symposium on Post War Planning

The symposium on "Post War Planning" was under the leadership of Morris Cohn, Sanitary and Testing Engineer of Schenectady, N. Y., who read a formal paper entitled "Brother Can You Spare a Sewage Treatment Plant." Mr. Cohn took as his theme the idea that municipalities should "spare" a sewage treatment plant, or improvements, now, at least to the extent of planning or design, in order to prevent the need for returning soldiers to plod the streets asking "Brother can you spare a dime?" "Must we be as unprepared for peace as we were for war?" asked Cohn. There must be a readjustment in employment for some 54,000,000 men to peacetime pursuits, and to maintain living standards will require an annual national income of 110 billion dollars. In order to obtain this perhaps 25 billion dollars a year will have to be spent by the Federal Government. Of this, 10 billion may well be for public works.

Sewage treatment must be a part of this public works program for a number of reasons. There is a need for 6000 plants in this country and these should be constructed in the first decade after the war according to Mr. Cohn. The construction of sewage facilities will require goods that are now going into war supplies, thus creating a market for the continuation of factory operation. The operation of sewage plants will take from the labor market many men now being trained in sanitation in the army. Supplies for sewage plants, particularly chemicals will soak up some of the surplus capacity now being diverted to war uses. Planning and design should proceed now because many consulting engineers are becoming available since army camp facility construction is dropping off. It would be criminal neglect to allow the abilities of these men to be dissipated in less useful pursuits.

Mr. Cohn pointed out certain trends in sanitation today which should have a bearing on the planning for the future. These trends include solving of pollution problems on a regional basis; fitting the effluent to the stream in accordance with the standards being developed for stream condition in various state health departments; and the consolidation of garbage disposal with sewage, either by individual grinding units or by municipal grinding stations.

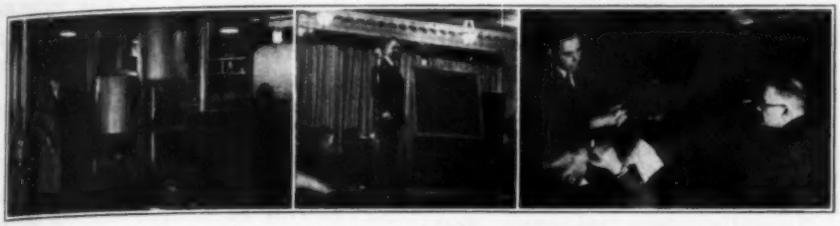
Sewage treatment will play its part in the post war plans, but we must decide now on the needs, the methods of financing, and the education of the public. The time for speculative planning is past and the time for design planning is here, concluded Mr. Cohn.

In the discussion which followed it was brought out that Greenwich has already engaged engineers with the idea of preparing post war plans. It was proposed that qualified speakers be available through the Association to help educate the public by talking to fish and game groups, but another speaker warned that the Association should beware of local selfish interests of pressure groups. Another suggestion was that lists of sanitation improvement needs should be drawn up.

Mr. E. Sherman Chase explained the activities of the Post War Planning Committee of the New England Water Works Association. (See the June issue of WATERWORKS AND SEWERAGE for a summary of that committee's progress report.) It was resolved by the members of N.E.S.W.A. that the president should appoint a committee on Post War Planning and that this committee should cooperate with the committee of the N.E.W.W.A. and with a similar committee of Federation of Sewage Works Associations.

Luncheon

Guest speaker at the luncheon was Dr. William W. Peter, Assoc. Prof. of Public Health of Yale University. Prof. Peter, who has spent fifteen years in the Orient,



(1) *Inspection of Boulevard Treatment Plant.*
(2) *J. Henry Giles' Chalk Talk.*
(3) *Elutriation (?) Round Table, Coburn, McDonald, Genter.*

(1) (2) (3) (4) (5)

Snapped at New Haven

(1) *Morris Cohn, Schenectady, N. Y. (Programmer)*; (2) *J. Doman, Greenwich, Conn., San. Engr., Dep. Pub. Wks.*; (3) *Kenneth Foote, New Haven, Laboratory Engineer; Harry Faber, The Chlorine Institute; Paul Hiller, Innis Spieden Co.*; (4) *Maj. Guy E. Griffin, U. S. Corps of Engrs.*; (5) *J. Henry Giles, Conn. Dept. of Health (Programmer).*

talked on the subject of "Fighting with China." Prof. Peter said that the preposition (in his subject's title) between the word "Fighting" and the word "China" had at one time or another been "for" and "against" as well as "with" and he warned that in the not too distant future the word might be "without."

After lunch President Suttie announced that a Certificate of Life Membership had been awarded to Mr. Julius W. Bugbee of Providence who also was awarded honorary membership in the Federation last October. A memorial tribute was read to Paul Martzel, Chief Operator of the Grass Island Sewage Disposal Plant of the Town of Greenwich. Mr. Martzel died last October.

Afternoon Session

With First Vice Pres. Joseph Muldoon of Bridgeport, Conn., presiding, a round table was held on the subject of "Operation of Sewage Treatment Plants in Wartime." Mr. Doman of Greenwich asked how one could efficiently operate a treatment plant when trained operators were being drafted. To this acute problem there was no direct answer. Mr. Warren J. Scott of the Conn. Dept. of Health, remarked that the War Manpower Commission has not set up a classification of sewage plant operators as such. If it is possible to request deferment on the basis that the operator is a skilled electrical operator or mechanic or other trained worker, it should be done. In any event the matter must be taken up with the local draft board which must have assurance that the man cannot be replaced. In one small community the assistant operator has been replaced by the wife of the operator. Perhaps employment of women is a partial answer.

Regarding war priorities problems, this reporter suggested that operators and engineers should write to Mr. A. M. Rawn, Chief of the Sewerage and Sanitation Section of the Governmental Requirements Division of W.P.B. in Washington.

Inspection Trip

Prior to the inspection trip Mr. Charles A. Emerson, Past Pres. of the Federation of Sewage Works Association and member of the firm which designed the Boulevard Treatment Plant, gave a short description of that plant and some of the more interesting problems of design. Designed and constructed on the shore, opposite a public park, the entire plant was given architectural treatment in keeping with its surroundings. Any other location would have required a long and costly outfall.

In brief the plant consists of pumps, settling tanks with straight line collectors, sludge digestion tanks with floating covers, chemical dewatering of sludge, vacuum filtration and multiple hearth incinerators. Chlorine is used in the summer for odor control. The entire plant is compact, occupying only 1.5 acres. Ample laboratory facilities are available but only a minimum of routine testing is performed.

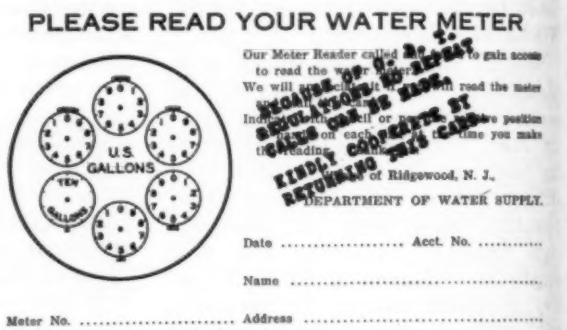
Ridgewood Revives Old Meter Reading Cards

Many communities have been using postal cards for customer use in reporting meter readings in place of repeat calls. Ridgewood, N. J., had tried that method several years ago for skipped meter readings. The returns at that time were less than 10 per cent and so unsatisfactory that the use of the cards was discontinued.

Superintendent J. A. Carr of Ridgewood's Water Dept., reports that recently the old cards were dug out of stock and over-printed with the following notation in red ink:

"BECAUSE OF O.D.T. REGULATIONS, NO REPEAT CALLS CAN BE MADE. KINDLY COOPERATE BY RETURNING THIS CARD."

The over-printing was done on an Addressograph and Mr. Carr writes, "Evidently, the spirit of the times, plus the red ink, has had the desired effect, as we are now getting about an 80 per cent return.


PLEASE READ YOUR WATER METER

Our Meter Reader called ... to gain access to read the ... We will ... read the meter ... Individual call or ... on each ... time you make the reading.

BECAUSE OF O.D.T. REGULATIONS, NO REPEAT CALLS CAN BE MADE. KINDLY COOPERATE BY RETURNING THIS CARD.

... of Ridgewood, N. J.,
DEPARTMENT OF WATER SUPPLY.

Date ..... Acct. No. .....

Name .....

Meter No. ..... Address .....

U.S. GALLONS

TEN GALLONS

Overprinted Meter Reading Report Card Which Has Done the Job.

Detroit Contracts to Treat Sewage of Fringe Communities

According to E. M. Shafter and Jay F. Gibbs, city managers of Royal Oak and Ferndale, Mich., the sewage disposal problems of several communities bordering the city of Detroit have been solved by an intergovernmental agreement whereby their sewage is to be received and treated by the City of Detroit and payment therefor made by the community served.

Eight cities, three townships, one county and the city of Detroit are involved in the agreement. Oakland County acts as the agent for the cities and townships in all arrangements with Detroit. A sixty-six inch interceptor and a pumping station are included in the plan which is costing $1,557,000. All dry weather flow will be taken into the Detroit interceptor while storm flow will be diverted to Red Run Creek.

The county will pay Detroit $137,833 per year for a flow of 30 cu. ft. per sec. or less. This may be increased to 50 c.f.s. and additional payment may be required for treatment and maintenance costs. The period of agreement is fifty years.

The County will be reimbursed in turn by each subdivision involved in the plan at rates sufficient to meet maintenance and operating costs for the system, a sinking fund and interest. The rates will be based on the amount of water used in each community. Service to any community will be terminated if the payment of charges is delinquent more than 90 days.

Home owners will pay an annual sewer service charge of about $5 to $7 but the actual rates will be determined in each municipality and must be sufficient to meet the cost assessed by Oakland County.

This system of intergovernmental cooperation in the solving of sanitation problems has much merit and bids fair to offer help to many communities not hitherto served by sewage disposal plants.

HOW'S YOUR SUPERNATANT?

(A Dear Bill Letter)

By E. ARTHUR BELL
City Engineer
ESSEX FALLS, N. J.

The Author

Dear Oscar:

How's your supernatant? With the weather jumping from winter to summer and the digestors acting as if they needed some "sulphur and molasses," the problem of dealing with that malodorous, *super* B. O. D. demanding, *colossal* suspended solids containing, non-alcoholic liquor (some understanding operators cover all the sins by merely calling it "supernatant") is with us again. Of course, if we had a normal spring here with resultant rains and high streams, the problem would be very simple (if Harry Croft of the Health Department reads this, I'm only fooling), but with conditions what they are, it looks as if we will have to get rid of the s. l. through the same pipes as the designer put on the plans.

Maybe your plant is big enough to absorb the additional load; you probably don't worry about it as much as I once did, but with our small plant we found that every time we dumped the s. l. into the primary settling tank, the effect was carried right through the rest of the plant. That d—— stuff (previously called s. l.) would change a beautiful alum floc into an unrecognizable liquid which for want of a better description we call colloidal, and said colloidal liquid would neither settle nor float in the final clarification tanks. This being the case, it would continue to the sand filters and raise merry h——. The substance that would neither settle nor float, sink nor swim, survive nor perish, would cling to the particles of sand with the tenacity of an octopus. Of course, that didn't do the sand filters much good and the resultant effluent was just plain bad.

However, when the plant was being built there appeared on the scene a smart young salesman named Tygert. Rather than have you think I am trying to promote any peddler's product I won't mention who he works for, but the initials are W. & T. He managed to sell the Town Fathers two of those devices for sterilizing the final effluent—one was plenty, but the commission for two is reputed to be twice what it is for one and he needed a new car, so we had a nice shiny machine with some excelsior still on the glass dome standing there waiting for something to happen. In those days rubber hose was still something that could be talked about above a whisper and also was sold at a profit. So, with a nice long piece, we ran a line from the aforesaid idle chlorinator to a point about two-thirds the depth of the sewage in the primary tank. Then we turned on the chlorine, opened the supernatant valve and watched. Lo and behold! the flocculator still flocculated, the clarifier still clarified, and the sand filters continued to filter. This has been tried daily for a period of five years (including today) and still works. Please don't write and ask me why, as I haven't had time to figure it out, but as long as it works like it does—that's enough. We feed chlorine at the rate of 42 pounds per 24 hours for a period of about 2 hours. The only reason we feed at the 40 pound rate is that Tygert put a 40 pound orifice in about 6 years ago and we cannot get a high enough priority now to get any other size. Have decided to let well enough alone.

Alum Feeding Kink

This is a long letter, but before closing, thought I would pass along another stunt. When the plant was first built, they neglected to meter the water used for various purposes —the Borough owns the water plant and furnishes free water to the Sewer Department. We found a spare water meter kicking around and decided to find out how much water the Sewer Department used. The result of this investigation was astonishing. The consumption was very high and subsequent study indicated that most of it was used in the solution pot of the alum feeder.

We attempted to cut down on the quantity of water, but that resulted in finding a sticky mass of undissolved alum in the bottom of the solution pot. It so happens that the farsighted plant designer had provided a flash mixing basin just in front of the flocculation tanks and said basin was all that the name implied. We removed the solution pot from the dry feeder and placed the latter right over the flash mix basin. Then we built a "Chic Sale" house (crescent model) over the entire installation. This being done, we resumed our chemical application by allowing the ground alum to drop right in the flash mixing basin. This method of feeding chemical has been in use for a year and at the present time is still functioning very satisfactorily. Oh, yes, if we had to pay for our water at the prevailing rate, the saving would be $1,500 per year.

With best regards and hoping you have plenty of sludge for your Victory Gardeners.

Yours,

Elmer.

New List of American Standards

The American Standards Association has recently published a new list of American Standards which will serve as a useful reference piece to engineering and purchasing departments of utilities and manufacturing firms. More than 600 standards are listed, 94 of which are new since last August.

Standards listed cover civil, mechanical, electrical, mining, chemical and other branches of engineering fields. A.S.A. specifications in many cases serve as a basis for municipal, state and Federal regulations and specifications, and a special section of the list is devoted to American War Standards developed specifically for war production needs.

This new catalog of A.S.A.'s "American Standards" which indexes each item, showing also the price charged per copy, constitutes a worthwhile reference catalog which may be had gratis by request to the American Standards Association, 29 West 39th St., New York, N. Y.

SPRING MEETING OF N. Y. SEWAGE WORKS ASSOCIATION*

ON JUNE 4 and 5, approximately 100 members and guests registered for the NYSSWA Spring Meeting in Rochester.

Trickling Filter Operation

The technical session was opened with a paper entitled "Standard Rate Filter Operation Experiences at Westfield, New York," by J. T. Howson, Plant Operator. Mr. Howson explained how several operating difficulties at his plant had been corrected and concluded with the statement that "B.O.D. reduction in a plant means little to a local taxpayer, but that exhibits of samples of sewage from various stages of treatment showing improvement therefrom, plus a clean plant with well kept grounds, means much more. Such a demonstration makes for a well satisfied taxpayer and aids in improving the status of the operator in his community."

In a prepared discussion Carl Bernhardt, District Health Dept. Engineer, Jamestown, pointed out the need of cooperation between villages and industries to solve industrial waste problems at sewage plants. Newell S. Nussbaumer, consulting engineer of Buffalo, stressed the necessity of consultation between plant operator and the designing engineer in order to straighten out operating difficulties.

Improvements at Freeport, L. I.

"Operation of Freeport, L. I. Sewage Treatment Plant Before and After Improvements" was presented by Edwin C. McKeeman, Manager, Sanitation Department. Improvements included a tank to concentrate sludge prior to discharging to digestion tanks. This device eliminates excess supernatant liquid from the digesters and results in improved operating conditions in the plant.

Luncheon and Gadget Contest

Five gadgets were submitted in the gadget contest. Award for first place was won by J. D. Slough, of Wellsville, for his entry of a magnetic valve for use in compositing a sewage sample. Second place went to H. C. Hutchinson, of Newark; third place was won by A. E. Martin of the town of Tonawanda.

At the noon luncheon on Friday, the presentation of the rating award for the best report on plant operation for the preceding year was made by A. W. Eustance, Chairman of the Rating Committee, to Edward J. Smith, Operator of the Niagara Falls Sewage Treatment Plant. In the presentation, it was pointed out that this was the first time a President of the Association had won the award during his term of office.

Post War Planning

Glenn D. Holmes, Consulting Engineer, Syracuse, New York, spoke on "Post-War Planning—Syracuse and Onondaga County." This post-war planning is not a program to make plans for all conceivable projects which may be invented to make work after the war, but a real plan, looking well into the future, for the lasting benefit of the entire area. Three groups have been set up: Research and Planning, Ways and Means, and Public Participation. Various agencies of city and county are also cooperating in this work. In closing, Mr. Holmes quoted Mayor Kennedy of Syracuse, "Three important things must be kept in mind: First, the initial concern of our county must be to win the war; second, post-war planning must be kept within the bounds of common sense; third, what is planned must be within our means."

Vacuum Filtration

Uhl T. Mann, Superintendent, Sewage Plant at Cortland, N. Y., read a paper jointly prepared with James T. Lynch, Superintendent, Sewage Plant, Auburn, N. Y., entitled "Rotary Vacuum Filtration of Sludge and the Effect of the War on Operation." This paper compared the operation of the two plants, one of which filters raw sludge and the other, digested sludge. These were the effects of the war on operation: (1) Increased load due to wartime industry, (2) Loss of personnel, (3) Difficulty in obtaining equipment and repair parts, and restrictions on necessary new work, (4) Increased cost for lower grade filter cloths, and (5) Increased cost of chemicals.

A paper entitled, "The Operation and Maintenance of Sewage Pumps," was given by Glenn Searls, Supervisor, Sewage Treatment Plants, Rochester, New York.

Sunrise Breakfast

The Saturday morning Round Table on "Questions and Answers on Wartime Operation of Sewage Plants" was conducted by Morris Cohn, Sanitary and Testing Engineer, Schenectady, New York, who listed twelve points where the war impact may affect sewage treatment plants, their operation and operators.

These points included such items as changes in population tributary, changes in composition and flow characteristics, effects of war shortages, increased costs of operation, protection against sabotage, and post war planning.

W.P.B. Priorities

A. M. Rawn, Vice-President of the Federation of Sewage Works Association and Chief of the Sewage and Sanitation Section of the Governmental Division of the War Production Board, addressed the group, discussing briefly his activities on this board and the general philosophy behind the changes in procedures due to the transfer of sewerage matters from the Utilities Section of the Power Branch to the Sanitation Section of the Governmental Division.

Mr. Rawn also stated the criteria governing new construction. (1) Is the work essential to public health and safety? (2) Is it essential to the war effort? These criteria must be applied in making application for priority assistance, and if application can prove that the work is essential for either or both of the above reasons, favorable action will undoubtedly be taken by the WPB. New construction must, however, follow wartime construction standards.

Major J. H. Brewster, USPHS, Office of Civilian Defense, New York City, pointed out the lack of organization, particularly on the part of inland communities in preparing for any reconstruction of sewage facilities necessitated by enemy action or sabotage. Most communities have been depending on contractors for this work, but contractors are not now available. This work is important because, in most instances, sewers will have to be repaired before work can be commenced on water mains.

*Excerpts from a report by A. W. Eustance, Asst. Secy., N. Y. S. W. A.

Barnes and Braidech Appointed W.P.B. Consultants

George E. Barnes, Professor of Hydraulic and Sanitary Engineering, and Mathew M. Braidech, Professor of Industrial and Sanitary Chemistry, Case School of Applied Science, Cleveland, have been appointed Engineer Consultants to the War Production Board, Copolymer Division of the Synthetic Rubber Program.

WATER PURIFICATION AND THE GREAT GILDERSLEEVE*

By MARTIN FLENTJE
Purification Engineer
AMERICAN WATER WORKS AND ELECTRIC CO.
NEW YORK, N. Y.

WHEN the Great Gildersleeve, Water Commissioner of Sumerfield, introduced a "snifter" valve to his thousands of radio listeners on his Sunday evening program, he was not naming a valve unknown to water purification men. To be sure, a snifter valve is not a common piece of equipment even in a purification plant or in a laboratory, but it is sometimes used in removing iron from water.

One can imagine a chemist hearing this particular broadcast, and saying to himself, "Now, where did that fellow, Gildersleeve, ever hear of a snifter valve? Somebody who knows something about running a water plant must help with that program. I'd like to try telling him a few things myself!"

Pure Water

Well, now what would a chemist tell about water purification that could be broadcast and make sense over the radio? The purity of water? Everyone talks about "pure" water, but could Gildersleeve get a laugh out of water not containing the specific bacteria, ("germs" he would probably call them) causing typhoid fever, dysentery and cholera?

Definition Difficult

Then the chemist might mention "potability" to Mr. Gildersleeve, and he'd probably soon wish he hadn't. For potability is a term almost impossible to define; "palatable and pleasant" might do; palatable—that is, not unpleasant to taste and smell; pleasant—agreeable to use, not too hard, not too corrosive on pipe, and a million things that make a water a good public supply. By this time Mr. Gildersleeve's face is beginning to fall.

"Say, this long discussion of pure and potable is getting us nowhere fast." Throckmorton, what you need is a story of some sort. Why don't you do a broadcast in which you give a talk before the Sumerfield Rotary Club on "The Purification of Sumerfield's Drinking Water?" To start things off you can pose as a magician changing water into solutions of several different colors. Then carrying on from there, you can ask your listeners to imagine you're magically turning them into those small invisible organisms—bacteria.

Ad Infinitum

"Can you imagine Judge Hooker only 1/25,000ths of an inch in height and becoming an old, old man ready to die in twenty minutes? Well, that's what would happen to the Judge if he were a bacteria. But don't laugh yet. Before that twenty minutes is up, the Judge would split in two and become 2 Judge Hookers, then 4, then 8, and so on and on. That's how bacteria multiply and why they're called fissure organisms.

"Continue with your magic, wave your wand and transport your now minute friends to a picnic place on the bank of a stream from which Sumerfield takes its water supply. Have a sudden rain storm come up, and then the Judge Hookers, the Mayor Terwillegers and the rest (after fissuring) will be swept down into the stream.

Looks Are Deceiving

"Then after a stormy journey, they enter the big storage reservoir about which Mr. Gildersleeve can say to Mr. Peavy, 'Isn't this a wonderful place? So quiet, so peaceful, so heavenly!', and Mr. Peavy reply, 'Well, I wouldn't say that! because the seeming peace of the reservoir is greatly misleading as far as the bacteria are concerned. The stay in the reservoir means eventually the death of as many as 70 to 80% of all the bacteria present, this many being removed by settling out to the bottom and by death through direct action of the sun's rays.'

"Those that are left embark on another adventure, first a long, dark, rapid journey through the transmission main to the purification plant where trap after trap have been prepared for the unsuspecting visitors. The first trap is the mixing basin, in it are what appear to be thousands of small octopi, each with grasping arms and fingers ready to entrap whatever they can lay their hands on.

Escape Me Never

"Gildersleeve's nephew, Leroy, would certainly have a time here. These are the alum 'flocs' and not even Judge Hooker can escape this time. For if he is trapped in a floc particle, he will settle out and die in the settling basin that follows. Here the water has a chance to calm down and drop out to the bottom, the now heavy floc particles which have also entangled with the bacteria any dirt or mud that was also floating in the water.

"Just to finish up the good work, the sand filters filled with specially graded, washed sea sand now enter the picture and except for a minute shot of chlorine, finish the job.

Reincarnation

"Then, Throckmorton, you can afford to be magnanimous and bring your listeners back from their various watery graves and back to life and normal size. Take them to the laboratory so that they can see for themselves what we know by test that all these things are actually true."

And the Great Gildersleeve says, "Yes, I'll just do that, and I'll end up the broadcast saying, 'Just think. Judge Hooker, the old goat—a germ at the bottom of a reservoir. En-ah-e-e-e-ee!'"

With that the chemist falls asleep. Awake, however, we predict you'll find the man-behind1the-chlorinator at your plant an interesting fellow, if you can ever corner him long enough to talk to him.

*This cleverly done article first appeared in Amer. Water Wks. & Elect. Co.'s magazine, "Water."

Chas. E. Inman Passes

Charles E. Inman, superintendent of the Warren, Ohio, Water Department for the past thirty-four years, died May 10th at the age of 78. His death was caused by peritonitis and ended a year of failing health.

Mr. Inman was a native of Statersville, R. I. He had been superintendent for the Warren Water and Light Co. from 1898 to 1912. When the city purchased its properties in 1921 he was brought back to Warren by the city and made superintendent of water.

Mr. Inman was civic minded. He was a past president of the Warren Kiwanis Club, had served as Y.M. C.A. director for several years, and as President of the Board for two terms. He was also active in other local enterprises beneficial to the children and the underprivileged of Warren. He was first, last and always a waterworks man and active in the Ohio Section of A.W.W.A., which he had served as an officer.

The Editor's Comments

Some Bad Eggs Get "Fryed"

MANY things on the program of AWWA's Wartime Conference in Cleveland last month interested water works men, but there was nothing on that program which gave as many in the audience as much satisfaction as did the recounting of the way the little town of Ilmo, Mo., dealt with one of those racketeering tank painting and repair firms, about which much has been heard during the past two years. We refer to the type of outfit that has been preying on small cities and institutions by offering to clean and repaint steel water tanks at an alluring figure in the low hundreds and then proceeds to take advantage of an inconspicuous repair clause in the contract to run the bill up into the thousands. The clause in question states in effect that if any weak rivets should be found such will be replaced with new rivets at a stated nominal charge per rivet.

On the face of it this repair contingency clause looks proper and reasonable, but the racketeering contractor proceeds to knock out and replace many perfectly sound rivets and thereby runs up the bill to a tremendous profit. If the tank owners demur in making payment before the job is completed the racketeers threaten to leave the tank owner with a non-serviceable tank on his hands and to bring suit for the amount demanded. Since a water tank is usually a pretty important unit in a water system the owner pays the bill rather than be left with a non-serviceable tank on his hands—*but, not Ilmo.* Little Ilmo, (pop. 1150), fooled 'em, for she had an interconnection with the system of a neighbor town and Ilmo's tank could, therefore, stay dry for awhile.

Some idea of how the painting and repair contract goes is illustrated in the case of Ilmo. The cleaning and repainting was stipulated at the flat figure of $185, which, of course, was suspiciously low in the first place. Before the job and contract was completed Ilmo was billed for $3000 plus. This "little" difference was a matter of charges for replacing just 1250 rivets in this 50,000 gallon tank. Of course the Mayor was horrified and shocked when such a payment was demanded. He was enough shocked, luckily, to know just the right thing to do. He picked up the 'phone and called a lawyer—and a good one so it proved. J. Grant Frye, whose law office is in Cape Girardeau, Mo., but who is a good citizen of Ilmo with the distinction of being Ilmo's Town Attorney, needed just 15 minutes to make the 15 miles back to Ilmo—and, gentlemen, that's when the fun started.

Now, this J. Grant, with a fighting stock name and a service record in World War I, wasn't somebody to be bluffed, and things began to happen fast. Action was needed and action was taken. He instructed the Town Constable (who happens also to be Water Superintendent) to take his gun and deputies and order the foreman and gang down from the tank and arrest all key men. While this was being done the truck and trailer of the U. S. Elevated Tank Maintenance Co. was chained and locked to an electric light post. From the company's head office in Memphis, up rushed tall, swarthy William Pietzman, its president, in a swanky, long-nosed Cadillac. While he was in the court room telling all that was going to happen to Ilmo for this outrage the "Caddy" went into "the bag" along with the truck and trailer. Ilmo at least now had something to convert into cash with which to complete the job of putting the tank back into usable shape.

This was "just the beginning" of the battle through the courts which did not prove easy with a fox of the Pietzman type and his well paid lawyers to cope with. But there was one statute with which neither was apparently familiar—a Federal law, which made it possible for Ilmo's fast thinking Town Attorney to throw the case into the Federal Court. There is a lot more to this story as it was given to an enthralled AWWA audience in Cleveland by J. Grant Frye, who at the end of a session's program was encouraged to carry on well over the closing hour, but space does not permit all of its telling at this time.

To make a long story short, on April 29th, 1943, the Federal Court decreed that damages should be paid to the Town of Ilmo by the U. S. Elevated Tank Maintenance Co. in the amount of $4,000 as the real damage—and, in addition, "punitive damage" of $10,000 was awarded. The $4,000 "pill" was bitter enough in itself but the "punitive damage" of $10,000, which was decreed as punishment considered merited by the U. S. Supreme Court was real "gall" to one William Pietzman and a world of satisfaction to little Ilmo and Ilmo's Town Attorney who, as he explained, asked no quarter and gave none. In the idiom of the South, as Brother Frye put it, "We really po'ed it on their 'ornery sore backs".

Mr. Frye, in tracing the history of the operations of Wm. Pietzman and his wife, Ethel Pietzman, revealed that one or both had operated several companies at various times. At one time it was the Mid-State Steeplejack and Construction Co., later the U. S. Elevated Tank Maintenance Co. of Memphis. Since the suit was started by Ilmo the Dixie Tank and Bridge Co. has been organized by Pietzman, with its main office in Nashville, Tenn. During the trial Pietzman got his name legally changed to W. A. Riley, by fraudulent methods according to Mr. Frye, so the new Dixie company also has an owner of a new name. Mr. Frye warned of the advertising of the Dixie Tank and Bridge Co. running in recent issues of what have been considered reputable magazines in the municipal field. He displayed a current ad from one of the convention issues, and pointed to the marked similarity of the copy and layout to the trade literature of the now defunct U. S. Elevated Tank Maintenance Co.

To us this whole thing is astounding, when considering that in the face of the records unearthed against Pietzman and the findings of the U. S. Court, an individual can get his name changed in a court of one of our leading states, set up a new company to carry on the same business under a new name, secure a satisfactory report in Dunn and Bradstreets' and attract the unwary by misleading advertisements in reputable magazines. In this day and age it seems to us that such things should not be possible; and, that the term *"Caveat Emptor"* should no longer have any place in the scheme of things. Some good lawyer or the U. S. Supreme Court may wish to explain why.

L. H. Enslow

MEETINGS SCHEDULED:

Aug. 11—WATERVILLE, MAINE.
Maine Water Utilities Association. Secretary, Earle A. Tarr.

Sept. 16-17—DENVER, COLO. (Hotel to be selected).
Rocky Mountain Section, A.W.W.A. Secretary, O. J. Ripple, Supt. Filtration, Littleton, Colo.

Sept. 22-23—PITTSBURGH, PA. (Roosevelt Hotel).
Western Pennsylvania Section A.W.W.A. Secretary, Earle P. Johnson, Wallace & Tiernan Co., 418 Flannery Bldg., Pittsburgh, Pa.

Sept. 22—BOSTON, MASS. (Hotel Parker House).
New England Sewage Works Association. (Fall Meeting). Secy.-Treas., LeRoy W. Van Kleeck, State Department of Health, Hartford, Conn.

Sept. 28-29—BOSTON, MASS. (Hotel Statler).
New England Water Works Association. (Annual Convention.) Secretary, Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

Sept. 30-Oct. 1—BINGHAMTON, N. Y. (Arlington Hotel).
New York Section A.W.WA. Fall War Conference. Sec'y-Treas., R. K. Blanchard, 50 West 50th Street, New York City.

Oct. 5-7—GRAND FORKS, N. D. (Ryan Hotel).
North Dakota Water & Sewage Works Conference. (15th Annual Convention). Sec'y-Treas., K. C. Lauster, Bismarck, N. D.

Oct. 11-13—OKLAHOMA CITY, OKLA. (Hotel Biltmore).
Southwest Section, A.W.W.A. Secretary, Geo. J. Rohan, Supt., Water Works Municipal Bldg., Waco, Texas.

Oct. 12-14—NEW YORK, N. Y. (Hotel to be selected).
American Public Health Wartime Conference. Executive Secretary, Dr. Reginald M. Atwater, 1790 Broadway, New York, N. Y.

Oct. 15-16—DES MOINES, IOWA (Hotel Fort Des Moines).
Missouri Valley Section, A.W.W.A. Secretary, Earl L. Waterman, Prof. of Sanitary Engineering, University of Iowa, 104 Engineering Hall, Iowa City, Ia.

Oct. 19-21—MILWAUKEE, WISC. (Plankinton Hotel).
Wisconsin Section A.W.W.A. Secretary, L. A. Smith, Superintendent Water Works, City Hall, Madison, Wis.

Oct. 21-23—CHICAGO, ILL. (Hotel Sherman).
Federation of Sewage Works Association. Annual Meeting, "War Time Conference." Secretary, H. W. Wisely, Urbana-Champaign Sanitary District, Urbana, Ill.

Oct. 27-29—LOS ANGELES, CALIF. (Biltmore Hotel).
California Section, A.W.W.A. Secretary, H. Arthur Price, Box 3669, Terminal Annex, Los Angeles, Calif.

Oct. 28-29—NIAGARA FALLS, ONT. (Hotel General Brock).
Canadian Inst. of Sewage & Sanitation. Annual Convention. Secy.-Treas., A. E. Berry, Dept. of Health, Parliament Bldg., Toronto, Ont.

Nov. 1-2—PITTSBURGH, PA. (Wm. Penn Hotel).
4th Annual Water Conference. Chairman, H. M. Olson, The Engineers' Soc. of Western Pa., Hotel Wm. Penn, Pittsburgh, Pa.

SEWER INSURANCE
UNINTERRUPTED OPERATION & INVESTMENT PROTECTION POLICY
Flexible STEEL
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$35.00 to $100.00 per capita or value of your sewer system
Premium
1/20 of 1% of investment in your sewer system

No reasonable businessman would permit an investment such as you have in your sewer system (from $35.00 to $100.00 per capita) to be unprotected by insurance. Unfortunately, no insurance company will insure proper functioning of your sewers. But you can carry this insurance yourself *at a very trifling cost!* All you need is a set of FLEXIBLES. They will remove roots, sand, gravel, slime—and add years to the life of your city's investment.

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INSERTING VALVES

THE A.P. SMITH MFG. CO. EAST ORANGE, N.J.

NO SHUT-DOWNS NECESSARY!

Water shut-offs mean Industrial shut-downs, and this in turn impedes the war effort. A valve insertion job does not necessarily mean that you have to shut down service. With a Smith Valve Inserting Machine you can insert valves with the service at full pressure. These machines are made in 6 sizes for inserting 4" to 36" valves, are simple and easy to operate and do a surprisingly quick, clean job.

Symbol of Quality Since 1889

Showing a 24" valve installed horizontally under pressure.

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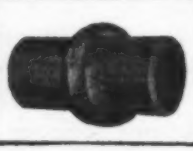
THE A. P. SMITH MFG. CO., EAST ORANGE, N. J.

WESTON



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The Perfected Method for Making
SEWER PIPE JOINTS OF CEMENT

- No jute used—gasket centers spigot.
- Definite space in each joint for cement.
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- Particularly advantageous in water-bearing trenches.
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SAVE *with* TENNESSEE CORPORATION Ferri-Floc

Write today for actual case histories of plants now using the ideal ferric coagulant.

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Atlanta, Georgia Lockland, Ohio

LITERATURE AND CATALOGS

How to Increase Automotive Engine Bearing Life is the title of the article in the April issue of "Lubrication" published by the Texas Co. This article is an attempt to explain briefly the fundamental factors governing the successful installation of precision type main and connecting rod bearings, i.e., explain this small but important phase of engine maintenance. The article contains comments and information on the development of precision type bearings, the sleeve bearing, why bearings fail, advisable precautions, clearance, misalignment, the fit of bearings in bores and caps, and out of round, scored or worn journals. A double spread of pictures and captions show filing bearing cap contact surfaces, burred connecting rod bolts, crank shaft cleaning bearing spread and so forth. A list of things to watch when installing bearings is also presented. This No. 4 issue of Vol. 29 and other issues in the series on "Lubrication" are well worth requesting from the Texas Co., 205 E. 42nd St., New York, N. Y.

The Kennedy Safetop Fire Hydrant is presented in Bulletin 62 of the Kennedy Valve Mfg. Co. of Elmira, N. Y. The folder outlines the design characterized as the fire hydrant that assures dependability in fire service, economy of maintenance, and long life of wearing parts. Sectional views in the folder, show the construction of the entire hydrant, with an enlarged illustration of the Safety Breakable Section which can be replaced within half an hour if the hydrant is struck in smashing collision. A complete parts list and dimensions are also included. Copies of the folder, Bulletin 62, may be obtained by addressing the Kennedy Valve Mfg. Co., Elmira, N. Y.

Heavy Duty Midget Chlor-O-Feeder is covered in Bulletin HDM-COF %Proportioneers% of Providence, R. I. This bulletin has been prepared to present detailed information on the installation, operation, and maintenance of these Heavy Duty Midget Chlor-O-Feeders. Information of interest to research laboratories, boards of health, district engineers and sanitary engineers is contained in the bulletin. A companion piece—Bulletin HDM giving complete

specifications of the Heavy Duty Midget Chlor-O-Feeder is also ready for distribution. Both of these Bulletins, HDM-COF and HDM may be secured by writing %Proportioneers% at 9 Codding St., Providence, R. I.

Handbook for the Welding and Cutting Operator is a helpful 20 page booklet for instructing users of the oxy-acetylene welding and cutting process how to prolong the life of their equipment. Published by the International Acetylene Association the handbook is written in an easy-to-understand style and contains a list of concise do's and don't's for the man who wields the blowpipe and a wealth of other helpful information and suggestions on the care and maintenance of blowpipes, regulators and welding and cutting accessories.

Copies of this handbook may be had by writing International Acetylene Association, 30 East 42nd St., New York, N. Y.

Valves, Fittings, Accessories, and Flexible Hose Assemblies are the diversified products of The Weatherhead Company, Cleveland, shown together in one publication for the first time in the new Weatherhead Catalogs Supplement, which is now available for distribution. This supplement is published for the convenience of engineering, production, designing and purchasing departments.

The supplement, eight pages in all, is a cross section of five lines of products. Each Weatherhead division is represented by a condensation of its regular catalog. These include the Aviation Division showing tube, pipe, universal and hose fittings, sixty-nine representative automotive and industrial tube and pipe fittings, valves, fittings, and accessories manufactured for the refrigeration industry, Weatherhead's exclusive Ermeto fittings, and Marine products. These fittings have found use in chlorine lines in water and sewage plants. Further information may be obtained from the Weatherhead Co. of Cleveland, O.

R-S Butterfly Valves, Specifications—15 to 125 psi are presented in Bulletin No. 16-B of the Valve Division of R. S. Products Corp. of Philadelphia, Pa. This 4-page illustrated bulletin contains complete dimension tables. These valves are for regulation and shut-off duty for air, gas, steam and liquids. The valves are manual or automatically operated. Bulletin 16-B may be obtained from the R-S Products Corp., Wayne Junction, Philadelphia, Pa.

THE ROYER

Model "SO"

Waste in Wartime is Unpardonable!

America has become waste-conscious. The waste of scrap metal, tin, rubber and other materials has been practically eliminated. We are fast learning not to waste food. The magnitude of America's job of even partly feeding several hundred million United Nations' people is becoming impressed on the public mind together with the necessity of increasing our food production to an unprecedented volume.

When sewage sludge is burned or buried, a flagrant food waste is perpetrated. Greater food production means bigger crops, and that necessitates more fertilizer. Sewage sludge contains valuable fertilizing materials which must be utilized. You can do your part toward increasing the food output at a profit to your country and at the same time eliminate the cost of sludge disposal, as hundreds of other sewage treatment plants are doing, with a Royer Sludge Disintegrator.

The sludge as it comes from the drying beds, full of lumps and caked, is shoveled into the hopper of this inexpensive machine. The Royer eliminates sticks, stones and trash; and breaks up, shreds, aerates and further dries the sludge. It discharges onto piles or trucks or wagons a valuable and marketable fertilizing material; ready for top dressing; or, wtih chemicals added, a high grade fertilizer. The Royer often pays for itself in a few months at a sewage treatment plant.

Available in twelve stationary and portable models, and in sizes for every requirement; electric motor, gasoline engine or tractor driven. (Furnished with steel wheels until rubber tires are again available.) Write today for Sewage Sludge Utilization "Datalog."

ROYER FOUNDRY & MACHINE CO.
170 PRINGLE ST., KINGSTON, PA.

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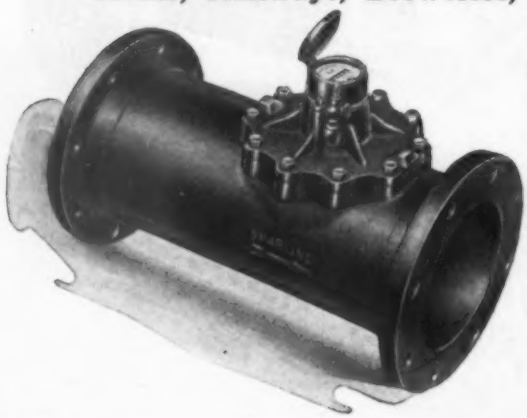
WATER METERS

In San Francisco —

San Francisco has used Sparling Main-line Meters since 1925. The users include the City Water Departments, Railways, Breweries, Sugar Refineries, Steel Mills, Utilities, Airports and Packing Houses.



A record of 150 Sparlings in one city reflects Service and Satisfaction.

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FERRIC CHLORIDE

35-47% SOLUTION
Shipped in Tank Cars

60% CRYSTALS
Packed in 300 or 500 lb. Barrels

★ SLUDGE CONDITIONING

★ SEWAGE COAGULATION

★ WATER PURIFICATION

THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

Redwood Pipe is the subject of a new 16-page brochure now being distributed by the California Redwood Association.

The past year's wartime curtailment of steel for pipe manufacture resulted in a considerable volume of inquiry about durable Redwood pipe, an efficient and economical pipe which was so widely used a generation ago on western sewage, drainage and water supply and distribution systems, and for irrigation and hydro-electric supply lines. To answer the questions on this "re-discovery" of Redwood pipe, the Association consolidated and brought up-to-date previous technical information on Redwood pipe, included new material, and published the bulletin as a comprehensive manual, covering both Eastern and Western practices in wood pipe construction.

By means of tables, text and drawings, the bulletin deals with the problem of installation of four types of Redwood pipe: continuous stave pipe, machine banded pipe, bored pipe, and Redwood lined metal pipe.

Copies of this bulletin will be sent upon request to the California Redwood Association, 405 Montgomery St., San Francisco, Calif.

Water Treatment is a 48-page booklet containing articles on scale, corrosion, and water treatment problems reprinted from the H-O-H *Lighthouse* published by D. W. Haering & Co., Inc., of Chicago. The booklet is profusely illustrated with tables, charts, and graphs. A copy may be obtained by writing D. W. Haering & Co., Inc., 205 West Wacker Drive, Chicago, Ill.

Bending and Flanging of Wrought Iron Pipe is a service bulletin prepared by the Engineering Service Department of A. M. Byers Company, Pittsburgh, Pa. It explains the theory and principles of bending and illustrates the explanation. Reasons for the stretching of the outside of the bend and compression of the inside of the bend are made apparent. Hot and cold bending are discussed and the essentials of good bending practice are summarized, with diagrams of the right and wrong way to make bends. Bending equipment and the method of using it is shown, as is the method of making the Van Stone Joint. For persons interested in wrought iron pipe bending, this 16 page booklet of information may be helpful. It may be obtained from the A. M. Beyers Company, Pittsburgh, Pa.

MANUFACTURERS' News & New EQUIPMENT

Columbia University Honors J. V. N. Dorr

At Columbia University's 189th Commencement exercises on June 1, the honorary degree of Doctor of Science was conferred upon John Van Nostrand Dorr in recognition

J. V. N. Dorr, D. Sc..

From a painting by Karl Anderson in the background of which appear the Research and Testing Laboratories of The Dorr Co. at Westport Mill, Conn.

of his contributions to Metallurgical, Sanitary and Chemical Engineering.

The citation recounted Dr. Dorr's lifetime of work in engineering as having been "...of exceptional service to the American people...as engineer, inventor, and administrator in the fields of metallurgical, chemical and sanitary engineering."

Dr. Dorr has been the recipient of a number of other honorary degrees. In 1914 Rutgers University, from which he graduated in 1894, made him a Master of Engineering and in 1927, presented to him the honorary degree of Doctor of Science. In 1940 both the South Dakota School of Mines and the Michigan College of Mining & Technology conferred upon him honorary degrees of Doctor of Engineering.

CONSERVATION OF EQUIPMENT IS THE ORDER OF THE DAY

Like every mechanism, an occasional lubrication of a hydrant repays with longer life and easier operation. Mathews' Py-Lubro H-20 Lubricant is scientifically prepared for this purpose. It is waterproof, frostproof and corrosion preventive. Under actual service conditions it constantly outlasts other lubricants. Mathews' Py-Lubro H-20 Packing is another outstanding contribution to easy, economical maintenance. Made from a new Du Pont packing material known as "Rayon Tow" it is tough, long-lasting. Treated with Py-Lubro Lubricant it provides a hydrant packing never before equalled.

The designing of a hydrant has a lot to do with maintenance, too! Mathews Hydrants have relatively few moving parts. Every friction point and every operating thread includes at least one bronze surface. All moving parts are contained in a removable barrel so that if any major repairs should be necessary, a substitute barrel can be placed in the hydrant while the original goes back to the shop. You'll find it pays to specify Mathews Hydrants for new installations and Mathews Py-Lubro Products for maintenance. Write for special lubrication and maintenance folder.

MATHEWS HYDRANTS
400 CHESTNUT STREET, PHILADELPHIA, PA.
ESTABLISHED IN 1803
Made by R.D. WOOD Company
MANUFACTURERS OF SAND SPUN PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES

SAVE MONEY USE ACTIVATED ALUM and BLACKALUM
STUART-BRUMLEY CORP.
516 North Charles St.
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ANTHRAFILT
A Filter Medium For All Purposes
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101 Park Ave. New York
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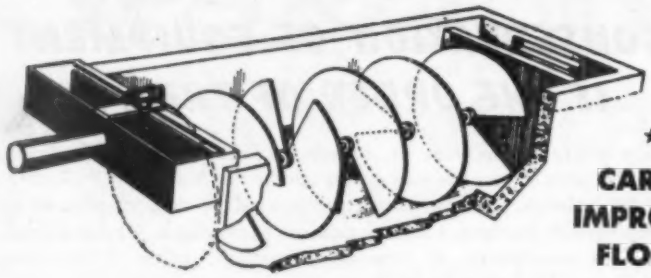
STATE COLLEGE, PA.

AERATORS • SIPHONS • WATER SYSTEMS

SLUDGE PUMPS • FLOCCS • CONDITIONERS • MIXERS

SEE PAGE ESSENTIAL PUMPS • CONDENSER PUMPS



★ CARTER IMPROVED FLOCER

Without Paddle Agitation

★ 10% to 25% shorter detention period.
★ Negligible power consumption.
★ Low cost installation and maintenance.
★ A series of flat discs, each with a segment removed, slowly rotated.
★ Agitation is set up by flow of liquid through the open segments.
★ Settling occurs between discs during the travel of the open segment in the upper half of rotation. Flocs are not cut up with a final result of a floc of sufficient size to settle rapidly by the time the mixture passes into the settling tank.

★

PADDLE TYPE FLOCERS AND AERATORS

Certain conditions require increased air diffusion in activated sludge treatment. The Ralph B. Carter Company manufactures a full line of paddle mechanisms. Careful design of shaft and bearings assure long trouble-free life under the necessarily difficult underwater operating conditions.

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★ THE NATIONAL METHOD • OVER 35 YEARS EXPERIENCE ★

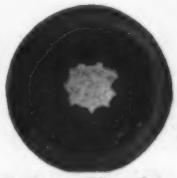
GUARANTEED TO RESTORE 95% ORIGINAL CAPACITY

DEFENSE DEMANDS

FULL CAPACITY MAINS

MANY cities that now find their water supply resources sadly overtaxed by the additional thousands of water users in defense industries and nearby army training camps, are turning to the *NATIONAL METHOD of water main cleaning* as an economical means of improving water service.

Cleaning by THE NATIONAL METHOD restores clogged mains to at least 95% of their original carrying capacity, making unnecessary large expenditures for auxiliary pipe lines, increased power at the pumps, new standpipes, etc.



Before Cleaning

After Cleaning

The NATIONAL METHOD

The National Water Main Cleaning Co.

30 Church St. Branches New York

115 Peterboro St., Boston, Mass.
910 William-Oliver Bldg., Atlanta, Ga.
7103 Dale Ave., St. Louis, Mo.
3812 Castellar St., Omaha, Neb.
406 Fla. Theatre Bldg., Jacksonville, Fla.
205 W. Wacker Dr., Chicago, Ill.
501 Howard St., San Francisco, Calif.
2028 Union Ave., Montreal, Can.

Porter of Pittsburgh Buys Quimby Pump

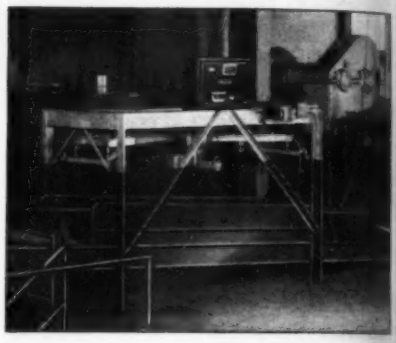
Purchase of Quimby Pump Co., with plants at Newark and New Brunswick, N. J., by H. K. Porter Co., Inc., Pittsburgh, Pa., has been recently announced.

Established before the turn of the century, Quimby Pump Co. manufactures a full line of pumps, including screw, centrifugal and rotex types long used in industry.

The Quimby plants will be operated as a division of H. K. Porter Co., Inc., manufacturer of chemical processing equipment.

Toledo-Chronoflo Totalizing Scale

Builders-Providence Co.'s Toledo Chronoflo Totalizing Scale is a flowmeter for solid materials. Features of the Chronoflo totalizer are the Toledo Precision Scale, Chronoflo positive "free scale" registration, high lever multiplication, automatic belt speed compensation, scale load indicator,



fully compensated straight-reading totalizer, and convenient tare adjustment. This new weight recording and flow control unit for sewage sludge, chemicals and other materials handled on belt conveyors may be installed on any belt conveyor handling dry, moist or even tacky materials.

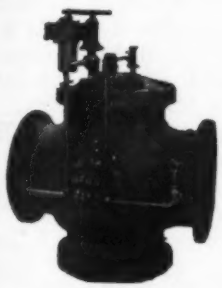
Two principal variables are involved in the integration of the load, belt loading per unit length and rate of belt travel. The chronoflo transmitter is part of the scale, transmitting the instant variations in the belt loading. Accessory equipment is available to balance the return belt against the loaded belt, thereby providing automatic compensation for any clinging of material to the return belt. These Chronoflo totalizers have already found use at several sewage treatment plants handling filter cake. A recent bulletin (No. 322) describing and illustrating the Chronoflo Scale, contains a data sheet which when filled in may be forwarded to Builder Providence Co. at 9 Codding St., Providence, R. I., if one desires information on the possible installation of one of these units.

· 1879 ·
ROSS
AUTOMATIC VALVES

ALTITUDE VALVES • SURGE • RELIEF • BACK PRESSURE VALVES
FLOAT VALVES • REDUCING AND REGULATING VALVES

ALTITUDE VALVES
for
Control of elevation and heads into and out of tanks, basins and reservoirs.
1. Single acting.
2. Double acting.
3. Combination assembly for three or more automatic operations.

COMBINATION VALVE
Combination automatic control both directions through the valve.
A self-contained unit, with three or more automatic controls.

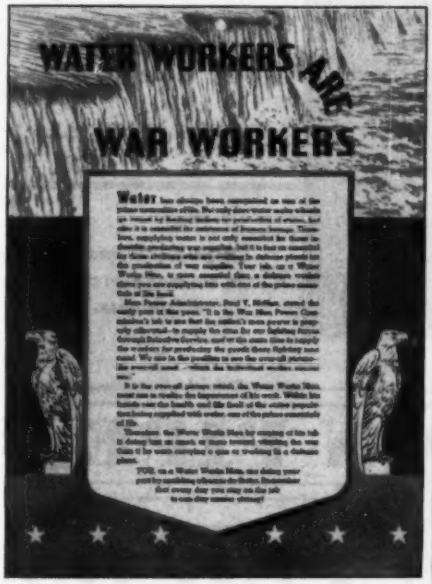


REMOTE CONTROL VALVE
Electric remote control—solenoid or motor can be furnished.
Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

ROSS VALVE MFG. CO.
INCORPORATED
P. O. BOX 595, TROY, N. Y.

Water Workers Are War Workers

This is the caption of an impressive poster handed out by the Industrial Chemical Sales Div. of the West Virginia Pulp and Paper Co. at the Cleveland meeting of the American Water Works Association in June. Printed in



red, white and blue, with a text within a shield, the poster, which is punched for hanging, elaborates on the thought that Water Workers *are* War Workers. Pointing out that water has always been recognized as one of the prime necessities of life and that water works men are doing their part by enabling others to do theirs the poster concludes that "Every day on the job is one day nearer victory."

This poster is well worth writing for. It should be hung in every office and plant of every water works to remind the public as well as the necessary water works personnel that the War Manpower Commission doesn't consider him a slacker, but an essential "Home Front Soldier," performing a high duty to his community for the benefit of the Nation at large.

Saran Pipe Available

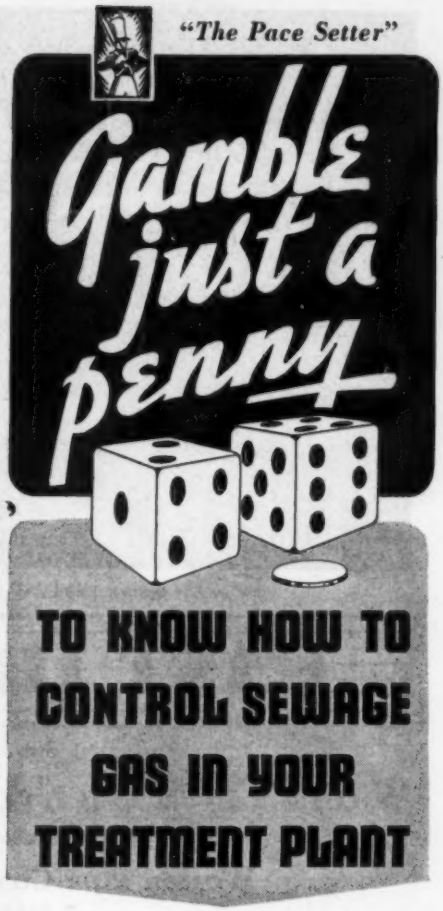
Saran Pipe is a companion product to Saran Tubing, produced by the Acadia Synthetic Products Division of the Western Felt Works of Chicago.

Nominal Size	O.D.	I.D.	Calculated Lbs./Ft.	Ft./Lbs.	Bursting Pressure 25° C.
½"	.840"	.546"	.236	4.23	1500 lbs. p.s.i.
¾"	1.050"	.742"	.320	3.12	1060 lbs. p.s.i.
1"	1.315"	.957"	.472	2.12	970 lbs. p.s.i.
1¼"	1.660"	1.278"	.650	1.550	820 lbs. p.s.i.
1½"	1.900"	1.50"	.790	1.27	740 lbs. p.s.i.
2"	2.375"	1.939"	1.09	.918	620 lbs. p.s.i.

Saran Pipe Dimensions and Pertinent Data

Folders and advertising sheets recently released by the company contain data and information on the physical characteristics and resistance of Saran, a Dow Co. plastic, to various chemical solutions. Saran may be welded in the

"The Pace Setter"



Yes . . . Your name and address on a penny postcard is all that is necessary for you to receive the new "VAREC" Sewage Gas Control and Safety Devices Catalog and Handbook S-3.

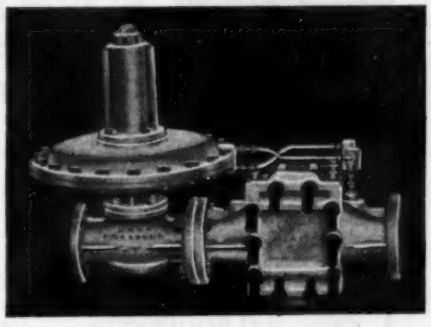


Fig. No. 440. "VAREC" Approved Pressure Relief and Flame Trap Assembly maintains a predetermined back-pressure throughout the system, passing surplus gas to the burner. It stops flame propagation. Non-corrosive aluminum construction.

"VAREC" APPROVED PRODUCTS
Pressure Relief and Vacuum Breaker Valves — Flame Arresters — Waste Gas Burners — Regulators — Check Valves — Manometers — Drip and Sediment Traps —Handhole and Manhole Covers — Sampling Hatches.

THE PACE SETTER SINCE 1928
The VAPOR RECOVERY SYSTEMS COMPANY
COMPTON • CALIFORNIA
NEW YORK CITY — HOUSTON, TEXAS — CLEVELAND, OHIO — TULSA, OKLAHOMA
Agencies Everywhere

24" pipe—Spring Lake, N. J.

FLANGED PIPE

FLEXIBLE JOINT PIPE

BELL & SPIGOT PIPE

SPECIAL CASTINGS

SHORT BODY BELL & SPIGOT SPECIALS

Large stock enables us to make prompt shipments.

CAST IRON PIPE

SIZES 1" TO 24"

Warren Foundry & Pipe Corp.

11 Broadway, New York

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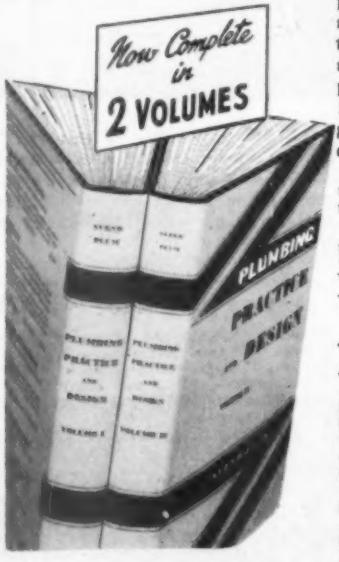
PLUMBING PRACTICE *and* DESIGN

by SVEND PLUM

With the appearance of Volume II, architects, engineers, plumbers, and draftsmen now have the essential, modern data on plumbing available in handy reference form.



This volume consolidates the facts on plumbing and presents in uniform terminology and logical sequence the material scattered through architectural, mechanical, sanitary, and civil engineering literature, with the purpose of presenting the whole in usable form. Definite procedure and information are given on design of the various pipe systems, equipment hook-ups, etc.

Volume I covers Corrosion, Materials, Pipes, Fittings, Valves, Controls, Fixtures, Pumps, Fire Protection, Air Piping, etc.

Volume II deals with Definitions, Regulations, Architectural Practice, Pipe Work, Water Supply, Drainage, Sewers, Gas Piping, Water Heating, etc.

Vol. I	308 pages	$4.50
Vol. II	329 pages	$4.50

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field by placing the ends of the tubing on a hot plate before butting together. The new Saran Pipe can be threaded with standard pipe dies. Six pipe sizes from ½ to 2 inches are available with elbows, tees, and flanges. Pertinent data and dimensions are shown in the accompanying table. The manufacturer announces that ells, couplings, reducers, nipples, bushings, plugs and valves of Saran are under production. Experiments have been conducted on the use of this material for water service lines in the Hydraulics Laboratories of the University of Iowa and elsewhere. Further information may be obtained from the Acadia Synthetic Products Division, Western Felt Works, 4115 Ogden Ave., Chicago, Ill.

Army Navy Production Awards

In the recent announcements of awards for Army-Navy production are three stories of interest to persons in the water works and sewerage field.

Builders Iron Foundry (Builders-Providence, Inc.) long prominent in the manufacture of Venturi meters, controllers, and gauges, has won for the second time the Army-Navy "E" for meritorious services on the production front—a symbol of appreciation from our armed forces for continued and determined effort and patriotism.

De Laval Steam Turbine Co., of Trenton, N. J., likewise has been granted a second renewal of the right to fly the Navy "E" flag with two white stars as a symbol of excellence in production of gears and turbines for marine propulsion, centrifugal pumps and compressors.

The Worthington Pump Co. Buffalo Works received its first award of the Army-Navy "E" in May at a ceremony in Buffalo attended by several high ranking officers of the Army and Navy.

And in Mt. Vernon, Ohio, we found the Cooper-Bessemer Co. flying its new Maritime "M" pennant with one star—an award for this company's production of Diesels for the Navy, the Merchant Marine and the U. S. Coast Guard.

Mathieson Begins Production of Magnesium

Production of magnesium metal by the Mathieson Alkali Works, Inc., at the newly erected magnesium-chlorine plant in Louisiana has begun. The plant, owned by the Defense Plant Corporation and operated by Mathieson, has a future capacity of more than 50,000,000 pounds of magnesium metal a year. Embracing unique design it is said

VAR-I-FEEDER
HYPO-CHLORINATOR

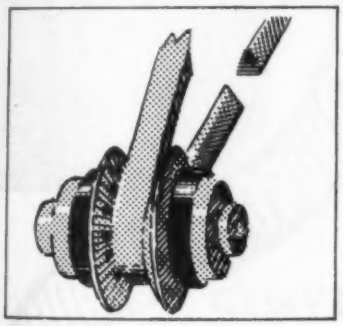
This model is enclosed in sheet steel case for permanent water plant installation and is wired to proportional control meter.

As simple as tuning in your radio . . .

Dosage and Rate of Feed Controlled Without Stopping VAR-I-FEEDER Simply by Turning Small Hand Wheel.

As hand wheel is turned, needle on illuminated dial indicates gallons per hour of solution fed.

The feed is changed by control of speed or stroking rate, using an adjustable variable pitch-diameter variable speed pulley, commonly known in industry as the "Reeves Drive" or "Ideal Transmissions".



Variable speed drive pulley in low speed position. Belt rides deep between widely expanded pulley-sheave-discs giving effect of small diameter pulley.

CHEM-FEEDS-INC.
77 RESERVOIR AVE., PROVIDENCE, R. I.
Tuff Coydon
President

to be the only plant of its type in operation. It employs an improved process of pure magnesium and liquid chlorine production developed by Mathieson engineers.

The principal raw material is dolomitic stone, from nearby quarries. This ore is calcined, the fuel used being locally produced natural gas. The resulting oxides of calcium and magnesium are treated with calcium chloride, a by-product of the process by which soda ash is made at the parent Mathieson plant in Louisiana. The mass is then treated with carbon dioxide obtained from the calcination of the dolomite, thereby converting the calcium into insoluble carbonate, leaving magnesium chloride, which, after concentration, is electrolyzed to produce magnesium and chlorine of high purity, both of which are highly essential to the war effort.

Don Atwell Assigned New Territory by Pittsburgh-National

Don J. Atwell, for the past four years has been serving the Pittsburgh Equitable Meter and its National Meter Division as a New England representative of Pittsburgh-National Meter Co., has been transferred to the Brooklyn-New York district office under the supervision of Mr. J. W. Fleet, district manager.

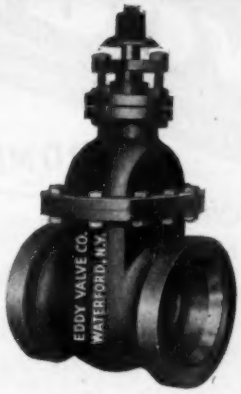
Don J. Atwell

Mr. Atwell will handle water meter sales and service in lower New York state, Long Island and New Jersey.

Dresser Makes Diesels for Russia

A new plan for replacing war-damaged power facilities of Russia's small war plants behind the lines, through the use of a large number of small diesel engine-

EDDY
FIRE HYDRANTS
AND VALVES—
WATER WORKS EQUIPMENT



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and
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Plants

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Waterford, N. Y.

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For Fire Protection Service

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VALVE COMPANY
WATERFORD, N. Y.

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A.W.W.A.

VOGT BROTHERS MFG. CO. Incorporated
MAIN AT 14th LOUISVILLE KY
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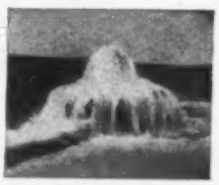
P. O. BOX 1122 LOUISVILLE KY

AERO-MIX AERATION - MIXER

AERATOR—MIXER

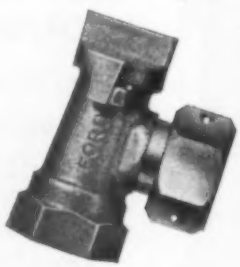
A Size and Type to Fit Your Problem in Water or Sewage Treatment.



WRITE FOR INFORMATION

Ringstyle VALVES

These are quality angle valves of the inverted key type with coupling nuts to attach direct to water meters.



RINGSTYLE Valves are made for connecting to iron or copper pipe. They save meter couplings, joints and space. Learn more about these useful fittings. —ask for our catalog and a sample RINGSTYLE Valve.

FORD METER BOX CO.
WABASH, IND.

driven electric generating units, is being furthered by one of Dresser's divisions, Clark Bros. Co. of Olean, N. Y., where a $4,000,000 order is being completed for diesel engines which represent a new development in the supercharged two-cycle field.

The company has also received a $3,000,000 order from the United States Government for marine engines of a similar type embracing the new adaptation of the supercharged two-cycle principle to the diesel field.

W. & S. Manufacturers' Ass'n Reaches 35th Anniversary

May 16, 1943, marked the thirty-fifth anniversary of the founding of the Water and Sewage Works Manufacturers' Association. About this Arthur T. Clark, Secretary-Manager, writes in the WSWMA *News Letter* of May 28:

"After 28 years of unofficial participation of water works conventions, the manufacturers who were Associate Members of the American Water Works Association held a mass meeting during the 27th Annual Convention in Washington, D. C., and considered the advisability of organizing an association. Representatives of the following member companies formed this first group meeting:

Booth & Co., L. M.
Fairbanks Valve Co.
Glauber Brass Co.
*Hays Manufacturing Co.
*Hersey Manufacturing Co.
Modern Iron Works.
*Mueller Manufacturing Co.
*National Meter Co.
*National Water Main Cleaning Co.
*Neptune Meter Co.
N. Y. Continental Jewel Filtr. Co.
Rensylaer Mfg. Co.
*Smith Mfg. Co., A. P.
Union Meter Co.
Water Works Equipment Co.
*Wood & Co., R. D.

The first Constitution and By-laws were adopted on May 16, 1908. At the first regular Annual Meeting held at the historic Astor House in New York City on January 11, 1909, thirty charter members were represented. Our first President, Mr. Denis F. O'Brien of the A. P. Smith Manufacturing Co., presided.

Due to the increased interest and activity in the sewage works field and to the fact that over 50 per cent of the members manufacture sewage works equipment, the scope of the Association was enlarged to include

*Still members of the Association.

INQUIRIES INVITED on all Problems of WATER TREATMENT

Whether your problem of water rectification is large or small, we have a form of equipment to serve your needs. We manufacture and install equipment for Gravity Filtration and Softening Plants; Pressure Filters and Zeolite Softeners; Swimming Pool Recirculating Appliances; and Water Treatment Units of all types.

ROBERTS FILTER MFG. CO.
607 COLUMBIA AVE.
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PITTSBURGH-DES MOINES
ELEVATED STEEL TANKS

Designed, fabricated and erected to meet your municipality's exact requirements. A complete range of types (hemispherical bottoms—hemi-ellipsoidal or toroidal bottoms—double-ellipsoidal designs) and sizes (from 5,000 to 5,000,000 gallons) for maximum performance and economy. Write for Bulletin No. 101.

PITTSBURGH • DES MOINES STEEL COMPANY
Pittsburgh, Pa. 3412 Neville Island
Des Moines, Ia. 913 Tuttle Street

For WAR EMERGENCIES

VALVES
HYDRANTS
AND WATERWORKS ACCESSORIES

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34.

M & H VALVE
AND FITTINGS COMPANY
ANNISTON, ALABAMA

OMEGA BELT TYPE
GRAVIMETRIC FEEDER

Weighs the material as it is fed on a short section of conveyor belt which is mounted on accurate scales. These feeders may be connected directly to large overhead storage bins if desired.

Accurate feeding range is from 5 lbs. to 3,000 lbs. per hour. A totalizer shows the number of pounds of material that have passed through the feeder.

The last word in Chemical Feeders

OMEGA MACHINE CO.
3409 E. 18th St., Kansas City, Mo.

sewage works activities, and the name changed to the Water and Sewage Works Manufacturers Association, Inc., in 1941.

For the 63rd Annual Convention of the AWWA, 78 member firms have booked 78 booths for exhibiting.

New Taylor Thermometer

Taylor Instrument Companies, Rochester, N. Y., have designed, tested in the field, and are now introducing a one-piece Industrial Thermometer.

The one-piece case is shallower which makes it possible to see the

mercury column through a wider angle of vision. The chromium-plated bezel fits snugly into the grooved case in such a way as to hold the thick glass front securely against four wavy tension springs fastened securely under the scale by shakeproof screws. This construction results in a dustproof, rattleproof, and practically fumeproof thermometer which can withstand vibration and severe shocks. The design saves many tons of critical bronze.

The new thermometer is equipped with easy-reading Binoc tubing. It will be furnished in many combinations of straight and angle stems, with threaded or union connections, and in many standard temperature ranges, within the limits of —40°F. to +750°F. Standard scale lengths are 7" and 9". For further information write to the Taylor Instrument Co., Rochester, N. Y. for Bulletin No. 98030.

LEADITE
The Pioneer Self-Caulking Material for C. I. Pipe

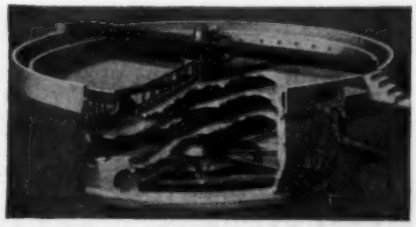
Reduces
Labor Costs . . . and

saves money in
many other respects

In addition to the large saving effected in cost of material, Leadite requires no caulking because it adheres to the pipe from the yarn or jute, out to the face of the bell—thus making a watertight bond.

THE LEADITE COMPANY
Girard Trust Co. Bldg., Philadelphia, Pa.

No Caulking



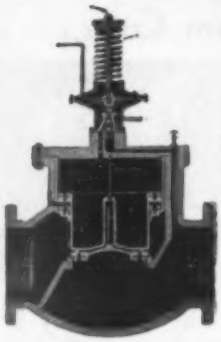
P.F.T. Clarifiers for Rapid Precipitation of Sewage Solids

The P.F.T. Tray Clarifier embodies a design which effects the continuous rapid separation of the solids and liquid in sewage; and the immediate removal of the clarified effluent. A series of shallow settling areas over which the sewage is spread assures speedy precipitation. Its high rate of flow provides maximum capacity in minimum space; reducing the construction and operating costs of clarification equipment.

Write for Bulletin No. 210 containing complete information, including operating results.

P.F.T. Pacific Flush-Tank Company
4241 Ravenswood Ave., Chicago, Ill.
New York Charlotte, N. C.

Stop Check
Single Acting
Altitude Valve



This valve installed in the upstream line automatically maintains a uniform water level within 3" to 12" variation to prevent any tank overflow; also, by means of the internal "stop check" piston assembly, prevents loss or return of storage water back through the valve—making the valve very desirable for use where metered water is purchased, or wherever it is imperative that there be no possible return flow.

This valve may be fitted with "Differential" Control for delayed opening, if desired.

Write for specifications and prices.

GOLDEN-ANDERSON
VALVE SPECIALTY CO.
Fulton Building Pittsburgh, Pa.

The
Meter-Master

RATE RECORDER FOR
WATER METERS

Send for Literature

F. S. BRAINARD & CO.
246 Palm Street, Hartford, Conn.

STOP
JOINT
LEAKAGE
WITH
CARSON CLAMPS
AND MECHANICAL JOINTS

Charcoal iron bolts for Cast Iron Pipe and Fittings.
Write for Prices.

Carson-Cadillac Co.
1221 PINSON ST. BIRMINGHAM, ALA.

Peerless Water Pumps Go To the Battlefront

Like many another product connected with the water supply industry, the pumps of the Peerless Pump Division of Food Machinery Corp., Los Angeles, have gone to war. One successful type for battle service has been the Hi-Lift pump, a "stockpile" pump because one size can be used to pump against a wide head range.

The Hi-Lift pump used for this service is usually powered with a light portable gasoline engine which drives the pump through a right angled geared head. The pumping element has a unique helical rotor, operating within a resilient rubber stator bearing, also helical in design. The hypocycloidal action of the rotor within the rubber sleeve literally "squeezes" the water uphill.

Peerless pumps have also been used in dry dock service to dewater large volumes of water from drydocks. For this work a deep well turbine type pump has been adopted although the head may be only 30 to 40 ft.

Another Peerless development is a unique type of submersible pump which can be attached to a hose and dropped within a hold of a ship for dewatering. Peerless pumps were also used in the job of dewatering compartments and cofferdams in the raising of many of the ships sunk during the attack on Pearl Harbor.

Greenman Joins Ludlow Valve

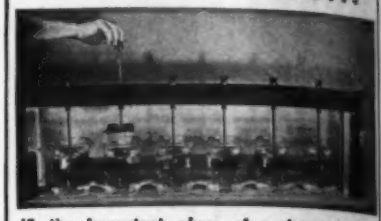
P. R. Greenman of Cincinnati has joined the Ludlow Valve Manufacturing Co. as industrial sales engineer in the Chicago territory.

Mr. Greenman is a mechanical engineer and designer of power plant equipment, oil refinery and coal handling equipment, and has had experience with the Detroit Lubricator Co., the American Valve Co., Wright-Martin Aircraft Co., the Power Specialty Company of Danville, N. Y., and since 1937 has been District Manager for Foster in charge of their Cincinnati office.

Dust Arrestor for Concrete Floors

A liquid silicate, easily applied by sprinkling or brushing to stop "dusting" of concrete floors has been developed by the Evercrete Corp., of New York. One gallon of this material will cover from 200 to 400 sq. ft. and may be applied during working hours without interrupting operations since it penetrates quickly. Impervious to acids, and odorless, this transparent liquid has water proofing qualities as well as imparting a greater resistance to traffic. It also serves as a binder

THE Phipps & Bird
LABORATORY MIXER . . .



IS the important piece of equipment in the Modern Water Works Laboratory. Now being used by leaders in water works research. Many superintendents and chemists have been able to reduce their chemical costs by the control of chemical dosages with this mixer. Write for literature.

PHIPPS & BIRD, INC. Richmond, Va.

BAILEY METERS
AND CONTROLLERS
FOR SEWAGE TREATMENT
AND WATER SUPPLY . . .

● Venturi Tubes, Weirs, Flumes, Nozzles and other primary elements; Mechanically and Electrically operated Registers and Complete Automatic Control Systems.

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1072 IVANHOE ROAD • CLEVELAND, O.
Bailey Meter Co. Ltd., Montreal, Canada

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DIAPHRAGM PUMPS

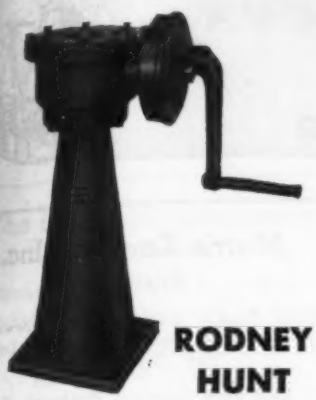
Hand Sizes 2", 2½", 3", 4"
Power Sizes 3" and 4"
Open Discharge or Force Pump
Edson Special Suction Hose
Red Seal Diaphragms
Strainers and Foot Valves
Hose Spanners—Adapters

THE EDSON CORPORATION
Main Office and Works: 49 D St.
South Boston, Mass.
New York: 142 Ashland Pl., Brooklyn

ZECO
GREENSAND
ZEOLITE

ZECO and HI-ZECO Greensand Zeolite for water softening, filtration and iron removal. ZECO Manganese Zeolite for iron and manganese removal. COREXITE mineral for corrosion control and water stabilization.

ZEOLITE CHEMICAL CO.
Sales Office 140 Cedar St., New York, N. Y. Factory Medford, N. J.
Pioneer Producer of
GREENSAND ZEOLITE MINERAL



RODNEY HUNT

FLOOR STANDS

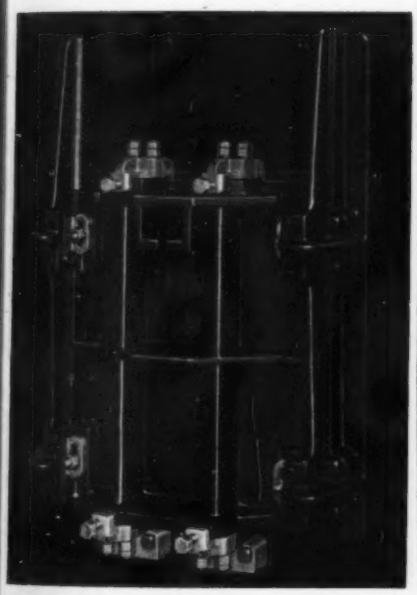
Photo shows an improved Rodney Hunt Floor Stand. It is equipped with efficient anti-friction bearings and is more compact and lighter than other models. This floor stand is available in a wide range of sizes and gear ratios for various loads. Rodney Hunt also makes timber and metal gates, gate hoists, flap and mud valves, and other types of dependable canal equipment, a field in which Rodney Hunt has pioneered for over 100 years.

Write for Special Catalog Today.

RODNEY HUNT

RODNEY HUNT MACHINE CO.

118 Lake Street, Orange, Mass., U. S. A.



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Distinguished by precision workmanship

If you haven't seen a National Sluice Gate you can't appreciate its unusual combination of giant strength and velvet-smooth operation. Finest materials, ample sizing, painstaking workmanship and assembly assure you of a gate which really shoulders the load. Send for descriptive literature.

NATIONAL MACHINE WORKS

1559 N. Sheffield Ave., Chicago 3, Ill.

for surfaces that are to be painted. Additional information may be obtained from the Evercrete Corp., 19 W. 44th St., New York, N. Y.

Griffin Wellpoint Opens Southern Office

The Griffin Wellpoint Corp. of New York City announce the opening of a southern branch office and warehouse with Mr. William J. Carr as Manager, at Jacksonville, Fla. Stocks of Wellpoint systems, jetting pumps, portable gasoline driven generators, will be carried for prompt shipment to nearby states.

New Outdoor Photoelectric Relay by "G.E."

A new general-purpose photoelectric relay for outdoor use has been announced by the Electronic Control Section of the General Electric Co. Designated as the Type CR7505-K108, it is for applications requiring rapid and accurate counting, controlling, sorting, or limiting operations. Its contacts control 2 amperes at 115 volts, 25 to 60-cycles, alternating current, or 0.5 ampere at 115 volts, direct current.

The amplifier tube is outstanding in two respects—its filament operates on full line voltage, eliminating

the need for a filament transformer; and it incorporates a diode rectifier which functions when a-c current is used.

The relay's weatherproof case is equipped with a sun shield and a large, directional lens system to minimize the effect of slanting sun rays. In addition, the lens system increases the relay's sensitivity.

The new relay can be mounted in any position and can be adjusted under actual operating conditions, without removing the cover. The chassis can be removed easily from the case for inspection or servicing or, if desired, for mounting with other apparatus in a combination enclosure.

Bulletin GEA-1755E gives details on this and other photoelectric relays. For a copy write General Electric Co., Schenectady, N. Y.

HYDRO-TITE

HYDRO-TITE — The self-caulking joint compound that makes cast iron water pipe joints — strong — tight — flexible and everlasting. Used on thousands of miles of pipe with a record of more than 30 years without a failure.

FIBREX — The sanitary paper packing that is used like braided jute. Free from bacteria — treated with a water repellent — put up in 60 pound reels. 70 pounds of Fibrex takes the place of 100 pounds of braided jute.

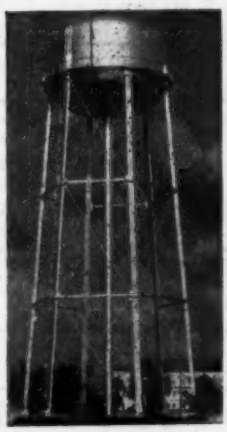
HYDRAULIC DEVELOPMENT CORPORATION

50 Church St.
New York, N. Y.

DRY BRAIDED Fibrex

RUST RUINS STEEL TANKS

PROTECT THEM WITH "RUSTOP"



"RUSTOP" the Cathodic System Immediately and Permanently Stops Corrosion on Submerged Metals—Economically.

CLEANS OLD TANKS
KEEPS NEW TANKS CLEAN

No Scraping, Sandblasting or Painting Required

THE APPROVED METHOD

RUSTOP THE CATHODIC SYSTEM OF CORROSION PREVENTION

ELECTRO RUST-PROOFING CO.

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Philadelphia, Penn.

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Water Works, Water Purification, Flood Relief, Sewerage, Sewage Disposal, Drainage, Appraisals, Power Generation

Civic Opera Building — Chicago

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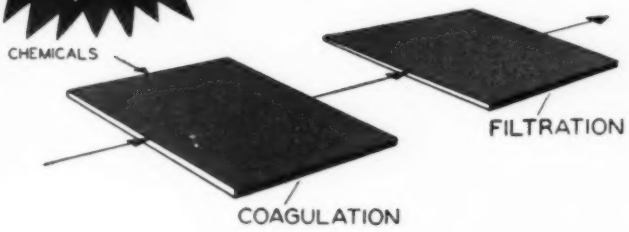

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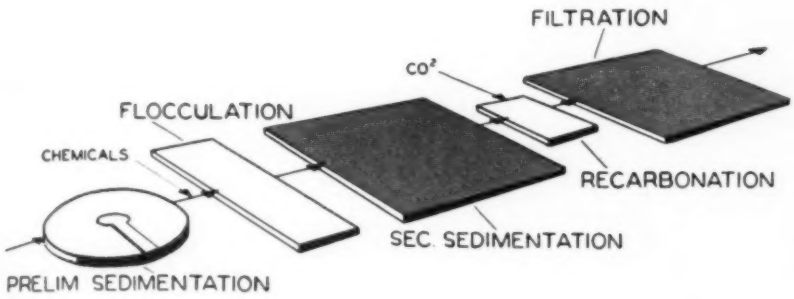

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